REPORT RESUMES

ED 016 825 VT 003 703

STUDY OF AGRICULTURALLY RELATED OCCUPATIONS IN SELECTED COUNTIES OF IDAHO.

BY- RICHMAN, ROBERT W.

IDAHO OCCUPATIONAL RESEARCH COORDINATING UNIT

PUB DATE OCT 67

CONTRACT OEC-5-85-118

EDRS PRICE MF-$0.50 HC-$2.84 69P.

DESCRIPTORS- *OFF FARM AGRICULTURAL OCCUPATIONS, BUSINESS, *VOCATIONAL AGRICULTURE, AGRICULTURAL SKILLS, *EMPLOYMENT OPPORTUNITIES, *OCCUPATIONAL SURVEYS, EDUCATIONAL NEEDS, IDAHO,

OVER 700 INTERVIEWS OF AGRICULTURAL BUSINESSES WERE CONDUCTED IN BONNEVILLE, BANNOCK, LATAH, CANYON, GEM, AND PAYETTE COUNTIES TO IDENTIFY AGRICULTURALLY RELATED OCCUPATIONS AND VOCATIONAL AGRICULTURE NEEDS. THE BUSINESSES WERE CLASSIFIED INTO FOUR GROUPS RANGING FROM HIGHLY RELATED TO AGRICULTURE TO NONAGRICULTURAL. WITHIN EACH BUSINESS, EACH SPECIFIC OCCUPATION WAS RATED AS TO WHETHER AN AGRICULTURAL BACKGROUND WAS NECESSARY OR ONLY DESIRABLE. SOME FINDINGS WERE--(1) APPROXIMATELY 25 DISTINCT TYPES OF BUSINESSES WERE IDENTIFIED AS HIGHLY RELATED TO AGRICULTURE, (2) ABOUT AN EQUAL NUMBER WERE CONSIDERED STRONGLY SUPPORTIVE TO AGRICULTURE, (3) SOME 35 OTHERS HAD A MORE CASUAL OR OCCASIONAL RELATIONSHIP TO AGRICULTURE, AND (4) A TOTAL OF 250 AGRICULTURAL OCCUPATIONS WERE IDENTIFIED. THE STUDY SHOWED THAT EXTENSIONS AND IMPROVEMENTS IN THE TRAINING OF AGRARIAN WORKERS WERE NEEDED PARTICULARLY IN BUSINESS MANAGEMENT AND SALES RELATIONS. THE IMPORTANCE OF AGRARIAN OCCUPATIONS WAS STRONGLY REAFFIRMED. SOME RECOMMENDATIONS WERE TO EMPHASIZE THE VALUE AND RESPECT OF AGRARIAN OCCUPATIONS AND THE AVAILABILITY OF AGRARIAN POSITIONS AND ADVANCEMENT POSSIBILITIES, AND TO MAKE IT POSSIBLE FOR STUDENTS TO CONCENTRATE ON ONE OF THE ASPECTS OF AGRICULTURE RATHER THAN ON THE COMPLETE RANGE FROM HIGHLY-RELATED TO AGRICULTURE TO NONAGRICULTURAL ASPECTS. THE APPENDIXES CONTAIN LISTS OF BUSINESSES AND OCCUPATIONS, THE MANUAL FOR INTERVIEWERS, A SUMMARY OF OCCUPATIONS, AND THE DESIGN AND STATISTICAL CONSIDERATIONS. (WB)

ED016825

Study Of Agriculturally Related Occupations In Selected Counties Of Idaho

April, 1967

THE STATE OCCUPATIONAL RESEARCH UNIT
COLLEGE OF EDUCATION
UNIVERSITY OF IDAHO
MOSCOW, IDAHO

VT003703

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

The State Occupational Research Unit
College of Education
University of Idaho
Moscow, Idaho

STUDY OF AGRICULTURALLY RELATED OCCUPATIONS IN SELECTED COUNTIES OF IDAHO

Kenneth M. Loudermilk, Director
Robert W. Richman, Assistant Director
Eddie D. Cecil, Research Fellow
Robert J. Heger, Research Fellow
Jack C. Pease, Research Fellow

Assistant Director Robert W. Richman
assumed major responsibility for
the analysis of data and for
preparation of this
final report

The research reported herein was initiated pursuant to
Contract Number OE-5-85-118 and was completed
pursuant to Grant Number OEG-4-7-063014-1590
with the United States Department of
Health, Education and Welfare,
Office of Education

October, 1967

TABLE OF CONTENTS

FOREWORD. i

ACKNOWLEDGMENTS iii

INTRODUCTION; The Agrarian Complex. 1
    Background; Methods and Findings in Other Regions. . 2
    Selected Individual Studies. 4
    General Perspective on Occupational Survey Research. 7
    Perspective on Objectives and Procedures 9
    Research and Perspective for Idaho 11

PURPOSES AND OBJECTIVES. 13
    Objectives Versus Design 13

METHODOLOGY; A Selected Composite 14
    Selection of Polulation of Businesses. 14
    Final List of Business Types 17
    The Interview Instrument; Purpose and Format 18
    Manual for Interviewers. 18
    Definition of Business and Occupation Categories . . 19

RESULTS AND ANALYSIS. 20
    Tables of Data 20
    Key Business Types 21
    Key Occupations. 23

INTERPRETATIONS AND CONCLUSIONS 25
    Rationale of Interpretation. 25
    Conclusions Regarding Occupations. 27
    Conclusions Relating to Research 28

IMPLICATIONS AND RECOMMENDATIONS. 29
    Implications for Agriculture 29
    Implications for Education 29
    Implications for Research. 30
    Recommendations. 31

SUMMARY 33

BIBLIOGRAPHY. 36

APPENDICES

    A; A Manual for Interviewers, with Supplement. . . . 1
    B; Tables I through V, Lists of Businesses. 15
    C; Tables VI through VIII, Lists of Occupations. . . 24
    D; Tables IX through XI, Summary of Occupations. . . 49
    E; Design and Statistical Considerations 59

PREFACE

This study represents a considerable effort to collect new and useful data in a field which presents extensive and peculiar difficulties for research. The field of Vocational Agriculture is even broader than formerly. It extends across most of the technical trades, encompasses not a little of the technical sciences, from inorganic chemistry to genetics, and is deeply affected by numerous areas of arts and social science, especially the fields of business management and finance, of marketing and distribution, and of home economics, esthetics, and design. Furthermore it is a field characterized by individual effort and independence of opinion and of decision among its practitioners, yet increasingly within a framework which involves collective interaction among groups.

Against all this complex background we cast the three additional problems, that of describing and assessing the agricultural labor market, that of considering the educational training areas involved, and that of performing this effort by a sampling of numerous employer opinions, in a geographically extensive and diverse setting which is the region primarily of Idaho. A fourth additional problem is in the technical restrictions we ourselves have set, in order to improve the reliability of the design and results.

This report of the study undertakes the additional problems, first of presenting a corrected image of the value of agricultural pursuits, second of reporting so as to serve additional research objectives beyond the description of findings, and finally of addressing these simultaneously to the several different audiences to which they may be of interest. Therefore, if the researcher feels obligated to attempt that much, may no man hope that the result will present perfection, nor that all topics in the pages which follow will be of equal interest to him. The table of contents will attempt to define the subject of each section in a way which will aid the reader's selection of items of interest.

The values resulting from the study should reasonably parallel the interests. Thus to the degree that we succeed in our efforts, these values will match the several direct and indirect purposes of the study. Major values cover the items which follow.

1) The study attempts to satisfy the need, as expressed by some consensus of opinion, for preliminary identification data on agriculturally related occupations in Idaho and on vocational agriculture needs generally. The agrarian occupations are here recognized as an area which has been much underrated in the public view, and which needs to be further described and discussed.

2) An example of general vocational research methodology which considers the merits of various approaches to "bread-and-butter" research was desirable at this time and is a natural corollary to the study. As a specific extension of this, documentation was desirable for a model of survey research in

contrast, on the one hand, with exploratory surveys which do not have research control; and on the other hand, with more theoretical or experimental research in which the variables can be manipulated for comparative control purposes. This is especially appropriate here because of the particular difficulty in providing careful research design for the varied and heterogeneous factors of the agri-business complex. Furthermore it is a service of the State Occupational Research Unit to provide such interpretive models and means of training in research.

3) It was important to correct or at least reduce certain weaknesses which have been evidenced in pioneering studies on agriculturally related occupations. This is not to detract from the several aspects of effective design which were noted. Particular use also was made of a sampling approach which some have described as "convergent trend design". This was used to improve the field procedure of a screening survey, and reduce it to manageable proportions.

4) A clarification was expressed, for the rather elusive questions (a) of need versus just desirability of certain job trainings, and (b) of relatedness versus incidental support of agriculture by other fields of business. Agri-business was thereby given an "operational definition" on the basis of degree, and a more definitive criterion for identifying agriculturally related occupations also results.

5) Businesses and occupations were identified and listed not just as being related, but in several degrees of relatedness. This supports purpose four and avoids the loss of certain information which a single composite list alone would have caused. The value of the idea of "degrees of relatedness" is thus presented for review.

6) Recognition was given to the appropriateness of various statistical treatments of data such as were obtained here. Also considered is the question as to which interpretations of the statistics are appropriate, and which are not, in view of the type of study and conditions.

As a final comment about the value and contents of the report to follow, we should mention three items. These were not attempted as specific objectives of the study, (it was broad enough already) but were recognized as probable consequences of it, and will be mentioned in the conclusions and elsewhere. First among these is the existence of overlap and interrelation of several vocational backgrounds needed by businesses, and thus by employees. Thus we touch the question as to whether, in the predominatly rural west, employees with a multiple background in several fields are especially valuable. Second is the question of areas needing most stress in vocational curricula. The findings and the implications of the present study give some evidence which no doubt should be taken further by curriculum specialists rather than the researchers of the present study. Finally, this study, improved though it hopefully may be, nevertheless presents findings which are subject to certain remaining weaknesses. These will be evidenced in this report, as topics for future improvement. If these indirect objectives are indeed accomplished here, they may prove to be the most enduring values of the study.

ACKNOWLEDGMENTS

This study is a cooperative effort in the best sense of the word. It is primarily the responsibility of the State Occupational Research Unit with the full support and cooperation of the State Department of Vocational Education under Mr. Sam Glenn. It has had the recommendation and support of the University, especially in the persons of Dean Everett V. Samuelson of the College of Education, and of Mr. Herb Winner, and Dr. Dwight Kindschy, of the College of Agriculture, Agriculture Education Department.

The Advisory Committee for the State Occupational Research Unit held meetings to discuss and recommend studies for the Unit, and the Committee members have made numerous suggestions, both then and since that time, which have been incorporated into the coverage and purposes of the study.

Appreciation goes to Mr. Stanley Trenhaile, Idaho Commissioner of Agriculture, and to Addison C. Beeman, Chief of Research, State Department of Employment; also to Frank Taylor of the same office.

Special appreciation is given to the two consultants, Mr. Thomas R. Flores, and Mr. Keith W. Renfrew, who have conducted a large part of the field interviewing. Without the special training and skill of the interviewers, and without the sacrifice of their families during the summer's field surveys, this study could not have been completed.

Appreciation certainly goes to Dr. Kenneth M. Loudermilk, Director of the Unit, and full and equal partner in the work of the present study. His contribution to the development of the original interview instrument was of major proportion, as was his participation in the large effort of determining and compiling the initial list of industries to be included in the study, and his advice and contribution in establishing the definitions and objectives. His continued encouragement of rigor in the procedures and the design development has been instrumental in maintaining quality and effectiveness in the study, and his participation in field interviews was of equal degree with that of the consultants and the Assistant Director.

The cooperation and encouragement of Chambers of Commerce and businessmens' organizations in the several communities surveyed has been a source of personal pleasure as well as material contribution to the surveys. Personal appreciation is expressed to these groups and individuals.

Furthermore, without giving individual identification which might violate the confidentiality of the data, we wish to thank the managers and other employees in the businesses interviewed. These persons have given generously of their time and knowledge, and it is their cooperation which in fact makes possible the findings of the study. In making these acknowledgments it is our hope that the results of this study will be of real aid and personal satisfaction to these contributors whom it is our pleasure to recognize.

In addition to those who contributed directly to the planning and the data collection phases of this study, were many persons who gave their encouragement, points of view, and judgment in such areas as interpretation of data and review of manuscripts. The present analyst is appreciative of these people, in the State Vocational Education Offices and other agencies, and among staff at the University of Idaho and other universities and schools. Their contributions in these less direct ways indeed make the results more valuable.

We would be remiss if we did not remember the heroic efforts of the secretarial staff who recorded, rechecked, and typed the voluminous tabulations and materials. From time to time they were imposed upon beyond the call of duty. Our thanks goes especially to Karen Bafus, and to Candy Nartonis, Charilyn Wise, Barbara Slaughter and Bobbie Wolf.

R. W. R.

INTRODUCTION

The Agrarian Complex

This is a report of research in a large and increasing field, notwithstanding that in popular opinion it is often considered unimportant or at least decreasing. It should become widely recognized that agriculture in America has been so greatly affected and enlarged by technology that agriculture and farming are no longer synonymous. Much of the work is in new categories. Work formerly done by farmers has been moved off the farm to become farm service industries. Other aspects of farming became farm products businesses, and specialized agricultural services of several types have developed. Thus, perhaps we should be using a more inclusive term, and speak of Agrarian Occupations. This might also help to overcome the stigma described in another study.*

> "..Farming 'lost face', even though farm efficiency directly resulted in the release of great numbers of workers to enter industrial employment, actually making possible the rapid growth of industry. . . . The influence of the farm upon continued progress is almost without limitation--it has long dominated cultural as well as economic development. It has been a way of life, standing firm as a symbol of freedom. . . Unhappily, this highly progressive movement has been interpreted to mean a decline in agriculture; subsequently, teachers and parents have acted to cause rural youth to look outside of agriculture for employment opportunities, when actually farming is and will continue as a vital and growing segment of the economy. Without the farmer and his counterparts in cities who process his production and service his needs, progress would come to an abrupt halt. . . .
>
> "Those in a position to advise with rural youth tend to 'short change' them if they look to agriculture for occupational opportunities without taking into account opportunities offered by sectors of agriculture located in urban areas; in fact, workers there out-number those on the farm, for as the worker leaves the farm, nonfarm agricultural enterprises add one or more workers, a nation-wide phenomenon.
>
> "Contrary to general belief, the combined sectors of agriculture offer a major source of occupational opportunities to youth, especially to farm boys who have a background of experience and training requisite to farming and (to) many jobs in nonfarm agricultural facets. Unluckily, there is a (dearth) of information available to educators describing job opportunities in agriculture, particularly those in nonfarm sectors; as a consequence, former

---

*References will be followed by a number in parenthesis which identifies the source in the bibliography of this report.

> students of vocational agriculture do not hold these jobs in significant numbers--studies made over the period 1918 to 1960 show only eight per cent of graduates employed in sectors of nonfarm agriculture, a condition traceable to narrow training programs." (39, pages 4 and 5)

Various reports indicate that for every person farming, there are as many as three to four persons who are in related occupations in support of farming.(60) The lowest ratio noted was in a California study which found that about 5000 farm workers are additionally needed each year, and about 8000 agriculturally related employees are needed.(58) This means at least 1.6 employees for every production farmer.

It is understandable therefore, that Vocational Agriculture under the more traditional high school course structure can no longer fully train the individual farmer nor the farm service worker, but only give them generalized background in several areas. The student would then begin specialization either in one of the traditional agricultural or "farm agrarian" programs; or else in the more recent off-farm "agrarian occupations" programs. Changes of some sort are needed at several levels. This is one of the important reasons that research is needed, as was recognized in the Vocational Education Act of 1963.

Communities differ in their problems, questions, and answers, so that there are quite different patterns of present and emerging agrarian occupations in different states and areas. It is thus most important that studies be made for Idaho, similar to studies made recently in many other states. Certain refinements are also deemed wise in order to properly judge the somewhat unique situation in Idaho. This should provide a better basis for several extensions of the data, such as determination of present and future kinds and numbers of job openings, re-examination of the range of subject-matter needed in vocational agriculture, needs for in-service training, etc. These extensions, however, are not themselves subjects of the present study, but should follow some necessary preliminaries. Such a total coverage is too large for a single study, or for several unrelated studies. It is important that any such several successive studies should be in some degree coordinated, both as to types of data sought, as to methods, and as to areas and regions included. The results will thus be greater in proportion to time and money spent.

Background; Methods and Findings in Other Regions

Although need for workers trained in agriculture competencies is acknowledged somewhat widely, and the value of local studies is recognized, yet possibly not always in full perspective. The focus has been well stated in a recent study:

> "It is now a matter of grave concern that vocational agriculture programs are not preparing rural boys for enough different kinds of jobs that are known to exist in the broad complex of

> agriculture, requiring knowledge and skill in agricultural subjects.
>
> "Few people understand the complexity of agriculture and appreciate the scope of occupational opportunities it offers to youth--it is big business, second to none, and to satisfy all of the people who seek its services daily, it must bring together a great complexity of knowledge and skill in agricultural subjects, supported by an animated structure of resources without equal anywhere.
>
> "Today, the most common question posed by those interested in agricultural education is, ' where are the jobs in agriculture; how numerous are they, and what qualifications are required for entry?' The question not only comes up when teachers meet to consider their problems, it also arises when leaders in agricultural education propose changes in vocational agriculture.
>
> "There is no easy answer, but a reasonable approach to the problem lies in research of a kind that will yield sufficient information needed to guide those concerned with rural youth to a full understanding and appreciation of the circumstances involved." (39, p. 2)

Perhaps the first major coordinated approach to research was a conference staged at Ohio State University in late May of 1963, specific to the problem of collecting data on off-farm agricultural occupations. In this and a succeeding conference, general study procedures were discussed, certain common objectives were agreed upon*, and agricultural competency was described as occurring within four traditional subdivisions namely plant and soil science, animal science, farm management, and agricultural mechanics. (41, 42)

In a somewhat different type of research approach from the above, Illinois researchers defined business in two degrees of agricultural relation,

---

*The usual form of these basic objectives is:
1) To identify present and emerging off-farm occupations needing agricultural competencies, and for which vocational and technical education in agriculture should be available.
2) To determine present and anticipated numbers of employees in each occupation, using classifications by industry, by function, and by field of activity designation.
3) To estimate annual entry opportunities for full-time and part-time workers.
4) To determine competencies in agriculture and in related business, distribution, and industrial fields needed for job entry and advancement.
5) To cluster occupations with common educational needs in categories that will facilitate efficient curricular and course organization in schools.
6) To obtain information on other worker traits that will be of aid in selection, guidance, and placement of individuals in order that their persistence, advancement, productivity, and satisfaction may reach maximum potential.

and they developed an extensive checklist interview adapted to computer use. This has also found favor in some of the more sophisticated later studies.(45)

A 1965 digest of studies in twenty-six states drew certain generalizations.(7) It was stated that competencies needed seem to relate strongly to the products handled by the business. A second generalization was that the greatest needs for agriculturally trained employees were in four business fields, agricultural supply and service, agricultural machinery and service, horticultural service, and food products marketing. Finally, nearly half the employees in these and other agricultural businesses need agricultural background.

The above generalizations reflect a heavy concentration of studies in urban and eastern portions of the country, and no doubt have "averaged out" some of the variations and specifics which are more important to individual states and differing areas. Furthermore, the interpretations await final data, for most states had only tabulated numbers of employees in each of several classifications, and had not yet processed the data on knowledge, skills, and abilities needed by employees. Selected individual studies have reported specifics which are important for our consideration here.

Selected Individual Studies

(a) In an extensive study in the central part of the country the rural counties were surveyed by the local vocational agriculture instructors, as phase one of a four-phase study.(23) All business firms which pay sales taxes were the initial source of selection. In this first phase stressing general information, it was noted that certain types of firms mainly found in urban areas had not been covered. In their results, the researchers were able to describe business categories as having a certain percentage of employees with agricultural background, and also obtained a comprehensive list of job titles. Farm Machinery businesses required the most workers of agricultural background, with Feed and Seed businesses second. Services were often multiple.

(b) An intensive southern study used the four areas of agricultural competency of the Ohio schedule.(39) Some fifty interviewers secured by the State Employment Security Agency for this task, were given intensive training over a short period of time. They were then utilized to interview all businesses in which the employer claimed any employees with agricultural competencies. This was conducted in the seven largest urban complexes of the state. Businesses were then grouped into eight occupational categories. (These are the categories, in fact, described by Hoover(27)in his "Handbook of Agricultural Occupations".) Agricultural workers were defined in two categories, those who served agriculture directly, and those who served it in an economic sense, but were not themselves in agricultural occupations. For example, many of these were office workers in agricultural service businesses.* The findings were that farm or agricultural background was desirable for 40% of these workers comprising some 9000 employees in 1582 different job titles. This strongly justified the offering of Vocational Agriculture in the urban high schools, where it served as an enrichment program of special benefit to potential managers and salesmen, among others.

(c) An eastern study of strong statistical design sampled five major areas of the state, including the metropolitan area of one of the country's largest cities.(28) It has previously been estimated that about 1% of the state's labor force or 17,000 persons were in farming, and 8% were in agricultural businesses. Several sources were used for lists of businesses for the study. By reference to the SICM codes, and as a means of reducing the magnitude of the study, the researcher selected for inclusion 13 groups which he felt were most closely related to agriculture. A 10% random sample was then taken, and this increased whenever an insufficient number fell in a particular cell of the resulting statistical grid. Agriculturally knowledgeable interviewers who were given almost daily supervision, were used. As a result, good confidence in the validity of the interviews is expressed by the researcher. An eventual total of 378 firms were interviewed, and data projected to the total of 168,000 agrarian businesses of these types. Half of these were found by projection to be in one of the three fields of Horticulture, Hardware, or Meat and Fish Markets. In the sample, rating was obtained of the 31,000 employees to determine whether none, some, or high agricultural competency was needed, and a competency index was then computed. Some 63% of these employees needed some agricultural competency. Recommendations included a curricular structure of 4-year sequence including Horticulture, Service Technology, Food Distribution, and Agricultural Science.

(d) A brief preliminary report of a New England state describes a sampling of 25% of the towns in the state.(35) Agricultural firms were identified from telephone directories by the vocational agriculture instructors. These were grouped according to the eight categories of Hoover, with 13 competency areas selected and 72 job clusters formed, to facilitate statistical design. Paid interviewers contacted over 50% of the firms. A competency factor was calculated, with caution given as to unwarranted generalizations from this factor.

(e) A representative northern study selected four key areas in order to gain a cross-section of the state, which is broadly agricultural and industrial.(22) From a list of business types supplied by agriculture instructors, employers were asked to state whether their business was related to agriculture. If so, they were asked to judge whether the several occupations were related to one of the four areas of agricultural competency. (These were the Ohio types.) Detailed classifications and families of occupations were obtained. Employers listed customer relations as highest on the list of training needs in their employees, which tended to also support agricultural background as a need. The study reported that about 33% of the labor force were connected with agriculture or agricultural businesses; about one-fourth of this group were in actual farming.

---

*Note that the occupational classifications are quite parallel to the two business categories used in the Illinois study.(45)

(f) A detailed midwestern study stratified and sampled all types of businesses appearing in the "Yellow pages" of telephone books, for 14 counties in one portion of the state.(45) Of 422 businesses surveyed it was found that 56% of the sample, or 234 businesses were agriculturally related. Agriculture competencies as such were not studied, but data on a "technician" category was determined for each business. The single type of "technician" was defined by five general abilities or skilled areas. Data was thus not collected on clerical, professional, or unskilled workers, but a number of questions were asked relative to the technicians, such as anticipated needs within the next five years, percent recruited within 25 miles, what number had post-high school education, etc. A factor analysis was run to 12 activity factors with the intention eventually to relate this to curriculum-revision.

(g) A study in the plains area adapted the Illinois interview instrument and independently defined four agricultural business categories, these being farm implements, farm supplies, farm produce, and farm service businesses.(53) The sample was drawn from various published composite lists of agricultural businesses in the state, and stratified according to four categories of urban population size. The fourth, which was 2,500 or under, therefore included the rural areas. The four trained interviewers made 495 contacts representing one-sixth of the firms in the sample. The 126 job titles obtained were grouped into 13 classes. Findings projected to state totals result in nearly 7,000 agriculturally related jobs, and about 20% of this number were found to be additionally needed within one year. Simple percentage statistics were calculated for the several classes and the need for agriculture training and certain trends were noted.

(h) A Pacific Coast study of the training required by workers in agricultural businesses found that one-fifth of the employees in these businesses needed agricultural training, in varying degree and kind.(58) This was from a survey of 327 businesses in fourteen towns. The types of businesses were not described in detail in the brief report, but it was found that there were excellent opportunities for persons with a combination of agricultural and business training, and that more communication between businessmen and agricultural educators would be beneficial.

(i) A southwestern study of two-year duration asked the employer the importance of not only agricultural competencies, but also those in distributive education, and in trades and industries.(57) Several levels of competency were used. By means of factor analysis to locate correlations or "high loadings", 10 major types of agricultural businesses were identified. The findings recommended attention to the needs of the student rather than just the community or the business needs, and it was found that a re-definition of the meaning of competencies was desirable.

(j) A Mountain States study used Dunn and Bradstreet as a source of the businesses, and selected a sixth of those listed.(52) This list then was found not to include certain areas of the state. Some businesses interviewed needed no agricultural personnel, so these were dropped from the sample for the remainder of the study.

(k) A western study surveyed the urban portions of the state, by a design and population developed through conference with a group of business representatives.(49) Four classes of agricultural industry somewhat similar to the Ohio groups were used. The Illinois interview manual was the guide for a four-page checklist interview which was then administered almost exclusively by telephone survey. It was found that about 50% of the agricultural employees in the sample were in the Animal Science Industries (dairy, butchering, etc.); about 22% in Crop Industries (nursery, produce handlers, millers, etc.); about 19% in Agricultural Mechanics (sales and service); and the remaining 9% in General Agriculture (agricultural business management and marketing). A need for vocational agriculture training in urban schools was established, which was what was desired to be proved.

General Perspective on Occupational Survey Research

Our review of these and other studies gives some perspective with which to proceed in the study which follows; various aspects of the above studies will be referred to as we proceed. Taken together, the studies give a large amount of valuable trend data of various kinds, in spite of varied approaches and some serious imperfections. We should inquire just what is the state of the art in occupational research. A recent article has considered a portion of the question, with the following answer:

> "In their review of research, Meyer and Logan describe distributive education research as being almost entirely descriptive in nature. Their investigation disclosed only one experimental study.
>
> "The authors ascribed the heavy emphasis on descriptive research to (1) lack of universally agreed-upon objectives, (2) lack of measuring instruments, (3) absence of controlled situations necessary for experimental research, and (4) dearth of qualified researchers. Lack of trained researchers was without doubt the greatest impediment.
>
> "As indicators of progress the authors cited (1) improvement in the quality of descriptive studies, (2) increased variety and sophistication of techniques, (3) great improvement in the processing of data with the use of electronic data processing, (4) better sampling procedures, and (5) increase in the number of studies." (67)

The tone of this and other articles seems almost to suggest that exploratory research is undesirable. It is hoped that what was meant by the statements was a desire to progress as rapidly as is feasible from the very necessary and important first stage, which is exploratory, to more sophisticated later stages of investigation and refined information.

Circumstances alter choices. It may be that due to limited time, staff, or sample numbers, it is better to proceed with a certain type of research effort than none at all. This is not to be considered a truism that runs at large, however. On the contrary, it easily would be possible to perform a "study" in such poor perspective or so poorly designed as to have no chance to accomplish anything except a waste of research effort and resources. It has been done on occasion.

The need for more and better studies is in no way pointed up better than by the above quotation and by the studies already completed. We do need to advance the state of the art. These studies have found a large number of "agriculturally related businesses" and of "agriculturally related occupations". The data obtained varies quite largely from study to study, but whether it varies because of actual differences in the occupations or regions, or due to unknown differences in the research techniques, is impossible to determine. One difficulty seems to stem from the fact that there is much difference in the degree of sophistication with which the different surveys were conducted. Another is that they have built their cases on differing, and often seemingly arbitrary interpretations as to level and degree. A guideline is needed, since these differences tend to produce as many unanswered new questions as they purport to answer.*

The question remains as to what methods of investigation are most justified. Perhaps there are improvements needed even in the best designs which have been used. Investigation brings the following authoritative advice:

> "Even if we would avoid ex post facto research, we cannot. It can even be said that ex post facto research is more important than experimental research. This is, of course, not a methodological observation. It means, rather, that the most important social scientific educational research problems do not lend themselves to experimentation." (30, p. 373)

---

* It may be unsophisticated to use a sophisticated (i.e. detailed) study design in such exploratory situations. Some researchers have deplored what they see as interference with progress caused by extreme variation in manner of conducting and reporting findings, saying that this hinders comparison of data and results from the several studies. Others have deplored the interference with progress caused, in their view, by a standardization of approach, saying that it hinders adaptation to different circumstances, purposes, and improved methods. Both points of view are correct, of course. There is harm in either direction, if taken to extreme. Happily we may take counsel from both or all the directions of approach and select or develop the one which appears best for our situation. Ideally it should be possible to standardize certain basics of approach, and leave the rest free.

The type of ex post facto research referred to is described even more thoroughly, as the author continues:

> "Despite its evident potential value in helping to solve educational problems, scientific survey research has not been used to any great extent by educators. Its distinctive educational usefulness, moreover, seems not to have been realized.
>
> "Survey information (usually) does not penetrate very deeply below the surface. . . . Sampling and the development of good schedules are major operations. Interviews require skill (and) time. . . . It is generally true that survey research demands large investment of time, energy, and money. . . .
>
> "Survey research also requires a good deal of research knowledge and sophistication. The competent survey investigator must know sampling, question and schedule construction, interviewing, the analysis of data, and other technical aspects of the survey. Such knowledge is hard to come by. Few investigators get this kind and amount of experience." (30, pp. 405-8)

There is, of course, a distinction to be made between "surveys" and "survey research". Surveys, as so often used in education and elsewhere, are not new and are not scientific. Survey research in the scientific sense, however, is new -- it is a development of the twentieth century. The procedures and methods of survey research have been developed mostly by psychologists, sociologists, anthropologists, economists, political scientists, and statisticians. They have given their strong stamp of collective strength to this type of research.*

In spite of the encouragement, it is not surprising from the above, that the survey studies in agriculture have not always produced the most useful results. One major point we may take from these references is that perhaps the studies have not utilized the best objectives with which to lead to the best procedures.

Perspective on Objectives and Procedures

A number of the studies cited above were hoping to justify a particular program, rather than having a more inclusive purpose of obtaining factual data about the occupational conditions. Others apparently were seeking good objective data but attempted impossible objectives or were less effective in some aspects of the study design than of others. Thus some studies began with samples which were not clearcut nor definite. If the sample approach taken could not be repeated by someone else, with appreciably an equivalent sample resulting, then the technique or design was bad. Even if replication was possible, did it really represent agricultural industry, or only some indefinite portions of the total agribusiness complex? Was any statistical design planned, and if so, was it a realistic measure of data, or was it more refined than the data? Was it interpreted accordingly?

---

*For some further details, refer to Campbell and Katona, on "The Sample Survey, a Technique".(6)

The researcher has an obligation to consider and preserve the strengths of his basic sources of data, lest others, (or he, himself) be led into drawing conclusions which may be statistically significant, (that is, mathematically correct) but insignificant or unwarranted from the data used.

Unwarranted statistics have a doubly bad effect. They suggest to the unwary reader that some mathematical magic has distilled out information which in point of fact was never in the original data. Statistics cannot perform alchemy, nor are statistics a catalytic panacea for salvaging the gems of information from the dross of error.*

Assuming the sample was properly selected and sufficiently large and adequate for the design, we must use good techniques to collect the data. Do all the interviewers have equal skill, understanding, and freedom from biases of their own; or if these differences occur, did the survey schedule include some means of cross-check so that these would not influence the results greatly, nor in unpredictable directions or amount? If vocational agriculture instructors (or some equally conscientious group with some special background) conducted the interviews, did they obtain factual data as they supposed, or rather, answers which the employers thought the interviewer would like to hear? Did the interviewers actually put words into the respondents' mouths, by the wording of their questions? It is so easy to do.

---

*This mixed analogy is instructive because it is so poorly joined. Research is not a matter of collecting a panful of aggregate from some stream of events and then by some factor such as goldpan rotation, hoping the dust of wisdom will "pan out" in a varimax direction. Tremendously valuable data may of course be rendered useless by taking it out of context into a generality before its relation is recorded. For example, erstwhile anthropologists have been known to feel they have an achievement when they dig some artifacts or fossil bones from some clay bank, and then display them proudly as coming from "the fight fork of Knowledge Creek, in a farmer's left field". Their discovery might have been of large scientific value had they adequately recorded the positions of the bones and their location in the strata of rock and soil, but their failure in survey research technique is of too great degree. Note that as a matter of scientific "curiosity" serving a personal hobby, this was perfectly acceptable, but as to research knowledge, they could be described as in left field part of the time. In fact I note on further inquiry that the fellow did not find the fossils in "the farmer's left field" but in a field which the farmer had left to go back to pasture. This makes a difference, of course.

Such types of "position error" often occur in statistics, especially when the data are smoothed or averaged to excess, as when the precision of the source is not matched to the degree of the statistical refinement.

Data analysis is only as accurate as the data. Is there large variance in the answers, so that an average or index would not really show the results of any consensus, but rather the middle of a broad span of opinion? If interpretations were made, were they the only likely ones, or are there alternate interpretations which possibly might not be so satisfying, but just as possible? A number of details of statistical application should be considered by the specialist in data analysis. Therefore it would seem more appropriate to refer these details to an appendix. (See Appendix E)

The goals and directions of studies are evidently influenced by the evolution, within their particular region, of new occupations requiring agricultural competencies, and of new businesses supportive of agriculture. This in turn is complicated by the existence of businesses of multiple types of service. It is also complicated by a certain confusion as to what is meant by "agricultural competencies" and even of "agricultural businesses".

One point of unanimity has occurred as an outgrowth of definition in the Vocational Education Act of 1963. In nearly all cases, studies have described agricultural relationship as competency in one or more areas of the vocational agriculture curriculum of the course of study for high schools.*

It should be clear that depending on the degree and extent of competency intended, and on the degree of generality selected, almost every business or endeavor could be considered agriculturally related. Conversely, almost all except actual farming could be eliminated. Since neither of these extremes is of help in attempting to answer questions or to establish appropriate present-day practices, then some reasonable definition and rationale for investigation must be selected or developed.

Research and Perspective for Idaho

Search of prior research in Idaho produces only two applicable studies on agriculture, both as master's theses. A 1965 study of the Jerome area was conducted for the purpose of giving information for development of agriculturally related curriculum in that school system.(34) Agri-business was defined as one which depends on agricultural production for its existence. An agricultural occupation is one in which the worker needs competencies in one or more of the four primary agricultural fields, these being the four selected in the Ohio Schedule. A sampling of 43 businesses considered to be agricultural yeilded a total of 540 employees of which 430 would be benefited by agricultural background. Jobs listed were grouped by skill levels for purposes of analysis. Employers placed emphasis on sales training, business education, speech, and mathematics.

---

*Often a somewhat modified description is used, as in the Ohio schedule. The six areas of that curriculum may be listed in the following traditional form:

I. Animal Management for Production or Show
II. Plant and Soil Management, including Horticulture.
III. Business Management and Agricultural Economics.
IV. Leadership Training for Cooperative Endeavors (FFA)
V. Supervised Farming or Other Work Experience.
VI. Mechanics and Related Skills with Agricultural Applications.

In a 1966 study of the Twin Falls area the purposes paralleled the Ohio recommendations.(32) The Agri-business population was taken from the telephone directory, and about one-third of these selected by an advisory committee for further interview. Thirty-four businesses were interviewed all but two of which needed agriculturally trained employees. Of these employees 27% needed agricultural background. Speech, business education, mathematics and English were also important.

The Jerome study found that about 80% of the employees of the businesses would be "benefitted" by agricultural training, while in Twin Falls, only 27% "needed" this background. Unfortunately we cannot directly compare these data, because it is impossible to determine how different is the meaning of benefitted versus needed in these two studies. We furthermore cannot determine whether the types of businesses sampled represent essentially similar samples. In general terms the studies give us certain useful information. There exist types of business which cannot serve their function without certain personnel trained in some phase of agriculture. There exists a second group of businesses which can compromise somewhat on this background and still provide their services though possibly on a less-than-adequate basis. There are evidently still others of only casual need.

Within any group of businesses, individual employers set different standards of background needed or desirable for different jobs. The final answer will amount to a degree of consensus in the community. Statistical summaries may be less meaningful (i.e., less correct) than more individualized breakdown.* With this knowledge we will take the next needed step, which leads us to consider the purposes which we have selected for the present study.

---

*We do not mean to imply that statistics should not be used, but that they should not be misused. Factor analysis, for example, was used in an Oklahoma study most appropriately to obtain tentative groupings.(57) The drawing of a straight random sample has important research strength, but poses a practical restriction where limited resources must attempt a large and extensive effort. Statistical strength and objectivity may be preserved by a particular adaptation. This may variously be described as "iterative closure design", as "a conic stratification", as "successive screening", or as "convergent trend". The name depends on whether described by a mathematician, a descriptive statistician, a sand and gravel contractor, or a trend analyst. The important matter is that it has been used in some manner by all these, and that it gets the job done, and that it is in reality just one of several kinds of stratified sample design. Like any other, it can be used in a careless and unsophisticated manner, or it can be used with understanding and skill, as we hope the present study will have done.

PURPOSES AND OBJECTIVES

The research purposes mentioned by the Ohio conference have become standard to some extent, at least as intended objectives if not as accomplished ones. It must certainly be recognized that though these may be among desirable goals for all states, they should not necessarily be interpreted as the best or the only objectives of particular studies which have their own special circumstances.

In a report on the subject of vocational agriculture in the state, we feel multiple obligations. In the first place, we have responsibility in public relations, since the public image of agriculture which we present should be correct and constructive. Secondly, we have responsibility for appropriate and respectable research. A third obligation is to obtain specific further knowledge of agricultural occupations. The purposes which we perceive for this study naturally follow:

(a) We need to obtain up-to-date and corrected information as to employer policy on agrarian occupations in Idaho; this will serve our first obligation.

(b) We need to proceed with a good illustrated research model for obtaining that data, thus to implement the first obligation, and to serve the second.

(c) We need to establish realistic objectives in the specific design of the study, thus to implement the second obligation, and to serve the third.

When we have met these objectives, we will have implemented the third obligation. These objectives specifically are:

1) To identify those types of business in Idaho that are agriculturally related,
2) To identify those types of occupations that are agriculturally related,
3) To estimate degree and consistency of relatedness,
4) To observe the possibility of clusters of occupations, which would aid in developing improved training programs,
5) To estimate needs within the next year,
6) To identify areas of suspected shortage of workers,
7) To attempt to discover weak areas of training or background,
8) To keep the design open to other indications or information which may have implications for future decisions or investigations.

Objectives Versus Design

To implement these objectives in turn, we must give serious consideration to the detailed choice of methods of research, since objectives which are unrealistic in the light of methods which are selected, will become unrealized objectives. Furthermore of course, realistic objectives might be compromised by failure of proper skill and perspective in use of appropriate methods. What then, of the design?

We are studying a field of phenomena which are on-going, which are not conveniently subject to experimental manipulation, which are matters of opinion of employers and in which probably all of us have our misconceptions and biases. From studies in all parts of the nation, we note that there are consistent regional differences in the trend toward more agriculturally supportive occupations. Perhaps one of the greatest differences is in the Horticulture specialty, which is developing and changing faster in the highly urban areas of the country than in the midwest for example. This condition of regional differences certainly increases the importance of studies in our own region. It does not discount the findings in other more intensified areas, however, for when we know the stage of transition we are in, we can then relate the findings of other areas to our own for predictive purposes.

Studies also show that businesses and occupations are somewhat different in different regions. Urbanization affects this, but it is also affected by the economic and labor force conditions of the area and the climate and resulting crop types. Finally, the conditions under which the interviews were made will have an effect. These things all have implications for effective research.

METHODOLOGY

A Selected Composite

First, in order to obtain data as independent of personal biases and opinion as possible, (and thus of greatest value to agriculture and to agricultural education) we designed the interviews to be conducted by disinterested and specially trained interviewers, with a careful sequence of questions. The resulting data should reflect agricultural relationship only as the businessmen voluntarily felt there was such, without being influenced by any unintentional preferences of the questioner.

Second, the intention is primarily to identify the businesses and occupations which have some degree of agricultural relatedness, and only secondarily to consider what degree of relatedness. The degree will be of greatest value as an indication of tendency or trend, rather than suggesting some artificially static condition of the economy at the time of the study.

Third, the interviewing was concentrated in a few widely separated but highly agrarian portions of the state, in order to obtain the greatest possible identification of agricultural occupations, with relatively few interviewers.

Selection of Population of Businesses

The procedure which has evolved is by intent a "conical design", which begins with a very inclusive approach structured to narrow to a close inherent in the paradigm. After securing all sources including those utilized by other studies, all types of business were included which the research staff considered possibly related to agriculture.* A resulting over-generous list was then drawn, in four-digit codes, from the Standard Industrial Classification Manual.(51)

Two considerations especially are involved here, and relate to the confusion between "Agri-Business" and "Off-Farm Agricultural Occupations". The former is a category of business which is clearly agricultural, but which contains numerous positions requiring no agricultural competencies. An example of the former would be a central office of a large implement dealer, in which accountants and typists are employed.

The second often occurs in a category of business which does not perform a service or distribution related to farm produce, but includes a few workers who require farm competency. An example would be a resort hotel for which one groundskeeper is employed who must be a trained horticulturist.

Thus any occupation which seemed to need competency in any of the six areas of the vocational agriculture program led to the inclusion of the business in which that occupation occurred. In case of doubt, the business was included. For example, the question of need versus desirability was not resolved, but was left for the interview results to provide an answer. The question as to whether the competency was used in agricultural application was also left for later decision based on employer responses. The intent was to avoid overlooking any categories which should be included, and to provide means for systematically eliminating those which should not be retained.

In the initial list we are especially concerned with borderline businesses. An example which might occur is Automotive Service Stations. These do not perform services related to farm production (except in a trivial way); however, they have employees who benefit from the leadership training of a vocational agriculture program, and also from the mechanics program.

For these "indeterminate" cases, we have selected a break point such that 20% of the individual businesses in a category must contain off-farm agricultural occupations before that category is considered agriculturally related. In practice the pattern is almost always much higher or lower than this cut-off point, and so is a clearcut case. Furthermore the establishment of a cut-off figure does allow an operational definition and a practical means of distinguishing the groups in a consistent and dependable way that is usable by others.

Screening is part of the initial field process. In any given four-digit category, from 5% to 10% of the businesses are interviewed, continuing until results are highly consistent. This results in eliminating those which do not fit the rationale of agriculturally related business. They fall into non-agricultural categories of rather straightforward type, on which further field studies would have meant clear duplication.*

---

*Included were (a) firms which process a farm product (b) firms which produce products which find fairly direct use on the farm, and (c) firms which render some agricultural service.

Excluded along with the above type of business are some others whose patterns are almost as negative. A category for which an occasional manager has required an off-farm agricultural position, but which occurs in less than 20% of the cases in a 10% sample of that category, is set aside. In cases within this pattern, the category is not eliminated until a minimum sample of at least 10 businesses has been interviewed.

Also eliminated from further interview in the present study, are businesses of the opposite, positive pattern. These are businesses in which the same off-farm agricultural occupations occur so consistently that further interviews would merely duplicate the positive findings. Also in cases in which the positive findings occur in 80% of the sample of 10 or more interviews, the category is established without further interview, and the data are projected to a 100% sample. These are clearly Agriculturally Related Businesses. In projecting the full sample, it is very helpful to know the approximate number of employees, as obtained in the initial card identifications. Therefore, in the case of the positive categories, the roster and card files of these are not destroyed, but set aside as part of the raw data.

The screening process described was accomplished in four agrarian counties in Idaho, with the hope that results would be substantially comparable in the several areas. Preliminary results in fact showed agreement in the removal of certain business types in each of the areas, and thus resulted in a further reduced convergent list of "Potentially Agricultural Business Types". This final Field List of businesses for which the initial field survey

---

*Such a case is the service station category. According to employers, the attendants do not require the agricultural aspects of the mechanics or leadership training programs, so that they are not in off-farm agricultural occupations. Therefore, as a result of interviews, the service station category is placed in a list of "Non-Agricultural Businesses".
Reference to authoritative experts to determine certain aspects of a type of business was a technique used in several of the studies. Such use to produce a step-reduction of a sample is appropriate and was applied in the Idaho study in a slightly different manner. Preconceived selection of some one firm or individual as an authority was not used, but rather a small cross section of typical employers in the industry were used as authority. Use of factor analysis techniques to effect classification and reduction is an extension which can be effectively used, but only after a full sample of data are collected. Also it requires that a competency index or other averaging method be applied, which may distort some of the results. Central tendency, expressed as a median, is perhaps better in such cases. The median was used effectively in a Louisiana study, for example.(38, 39)

was not conclusive, was then compiled for a 100% sample of establishments in the selected counties.* By means of this smaller list, the objectives are achieved in a more efficient way, in which the validity is expected to be at least as good. One practical reason is that by removing unnecessary and excessive duplications in the field work, we avoid repetitive pressures which produce an unconscious lessening of effort in the most conscientious of interviewers.

Final List Of Business Types

Those categories remaining in the final interview list, and therefore not clearly established by the screening described, are of two types. They are either those which occur so infrequently that an insufficient number (less than 10) have been interviewed for adequate analysis; or those which are not yet clearly classified, probably because of changing technological factors which are causing the emergence of new types of business. Occasionally a business of several diverse services is found, but in essence this is an instance of emergence of a new type of business service which is still in a rather "amorphous" condition, and usually will be found to develop a standard pattern and service category in the future.** In any case, such businesses constitute that portion of the business complex which is indicated as the subject of further study so long as their classification remains indefinite.

The final list of businesses on which data will be reported therefore includes those identified as agricultural during the screening, on which a smaller percentage sample has been taken; and those remaining in the Final Field List, for which a full sample was taken. This final list represents the following areas of the state: (a) Bonneville County, (b) Bannock County (c) Canyon, Gem, and Payette Counties, and (d) Latah County.

---

*The foregoing discussions should have made clear that the initial field studies rather effectively serve to narrow and delineate the further phases of the study, by this "operational" identification of types of business which definitely are agricultural. This greatly reduces the amount of field study needed in other portions of the state. It also structures the groups so that there is more order and design whenever small samplings may be desired in other counties. These samples would be used mainly to determine whether a category of business in another locality is of about the same employee composition as in areas already studied. This measure of comparability is a means of increasing the accuracy of any projection of numbers of employees in a given occupation throughout the state.

**Some studies have attempted to use too fine a breakdown of categories of business. Thus it would be possible to select classifications so narrow that few businesses would be that specialized in the rural west, or indeed in small towns anywhere. It is here assumed that categories listed in the tables of this study will best illustrate and even define the degree of subdivision which is desirable and realistic. Any more refined grouping may not be practical in any state, due to changes in employer decision caused by effects of wage scales, the labor market, and related economic and social factors.

The Interview Instrument; Purpose and Format

An interview schedule was developed with a carefully designed sequence leading from general employee qualifications to specific agricultural requirements. This enabled a much improved determination of actual "performance requirements" as distinguished from "ideal requirements"; it was further facilitated by utilizing trained psychological counselors as interviewers. By the nature of their training and experience, these persons are especially fitted to maintain objectivity in the data, and to conduct the interviews in an informal manner yet with opportunity to interpret the employer's responses. By this means more valid and consistent results are possible.

The interview schedule will structure conditions similar to a counseling interview in which every effort is made to draw out the employer as to his hiring criteria, but in a casual manner. The purpose is to obtain sufficient data to determine the hiring practice even though the employer himself may be only vaguely aware of his policy. In an unobtrusive way, the interview is highly structured so that the questions lead the respondent to verbalize his attitudes on vocational training and experience requirements, leading finally to the specifics of agricultural training, experience and background. This procedure is in accordance with the specific training in counseling interviews provided for all psychological counselors.

The sheet on which to record the interview data is designed to establish the sequence mentioned. The employer's general information as to jobs is recorded such that it is easy to refer back to this as the interview proceeds. This also enables better control of the interview, and gives chances to add coded data to the appropriate initial information. The interview schedule will appear as part of the interview manual.(See Appendix A, page 13.)

Manual for Interviewers

In order to provide comparable performance by all interviewers, and to acquaint them with the sequence and approach before they make actual field contacts, a written manual was provided. This manual assumes a considerable prior training and experience in counseling. It thus explains each question of the interview in terms of desired manner of approach and effects sought, rather than with detailed technique. A casual interview manner is stressed.* The manual will appear in Appendix A.

The total research rationale of the study is therefore parallel to the pattern of the interview schedule itself. As the study proceeds, the questioning narrows to concentrate on just one aspect of the total work force, and on just one portion of the business complex. Just as we said that the interviews draw to a close very suddenly, so also the breadth of the field contacts closes very rapidly. In practical terms, all this means a more comprehensive effort in the four specific areas of the state in which the initial field studies have been concentrated.

---

*Those readers who desire guides to detailed technique may be interested in discussions by Stewart Harral(25) and by Kahn and Connell(29) among others.

Definition of Business and Occupation Categories

Although categories were selected when compiling the population, yet the actual definition of one or another category of business or of occupation as agricultural has necessarily become a matter of operational definition based in the last analysis on a percentage of employer responses. As seen above, these are not always "black-and-white" but include a range. It has nonetheless been possible to establish a research paradigm with practical working methods adaptable to other states or areas. We may now summarize the grouping of businesses into three divisions.

One group we have identified is those businesses which are necessary to the farmer's productivity, and in fact which used to be a part of the farmer's work in order to produce. These are called Agricultural Business. An example is the Feed and Seed Business, perhaps better described as the Agricultural Supplies Business. A second group, those businesses which are not agricultural, but which utilize and retain agriculturists in their employ, are Agriculturally Supportive Businesses. Together these two comprise the larger group called Agriculturally Related Businesses. This combined group is expected to draw more or less widely from the graduates of the Vocational Agriculture Curriculum in high schools, and from those with one or two years of pertinent post-high school training.

Within either of the categories of Agriculturally Related Businesses above, those workers who require competency in one or more of the six major branches of the vocational agriculture curriculum are in off-farm agrarian occupations. To "require competency" is here intended to mean that competency in the agricultural applications of the curriculum is needed. Furthermore this need (as contrasted with desirability) is determined by the consensus of the several employers in each category of business studied. This stresses the necessity for careful interview design and performance.

In the process of defining and of discovering agricultural businesses and occupations, those which do not quite fit the requirements usually fit one of two distinctions. Either the background in agricultural curricula is only desirable rather than necessary, or the non-agricultural aspects of the curriculum are necessary but the relationship to agriculture is not necessary. An example of the first would be a salesman who would be more effective with agricultural background but who might do an adequate job with what he could learn "on the job". An example of the second case would be a welder or an auto mechanic who performed no agricultural applications of his work, but might obtain training through a traditional vocational agriculture program.

Businesses which sort into this latter group are here defined as the third original group, namely Agriculturally Benefitted Businesses. Occupations which sort into this pattern are called Agriculturally Benefitted Occupations. These might logically seem to fit within the inclusive group identified above as Agriculturally Related Business. However, the fact that they contain no true, (that is, "necessary" in degree) agricultural occupations, as defined in this study, puts them outside that category. In other states, or in cases for which the criterion becomes desirability rather than need in agricultural competency, then such businesses might be found reclassified as agriculturally related business. For present purposes, the basic identification and grouping of these businesses is the important matter. Modifications may later proceed more easily from the above structure.

There is thus established in the present study, a structured set of descriptive titles and definitions which it is hoped will relate and yet distinguish the several categories, and serve to clarify the heretofore confused usage of these terminologies.

RESULTS AND ANALYSIS

Employers' responses in direct interviews have given interesting and sometimes surprising information. They provide an indication of the current practice in a given industry in a given geographic and economic area. This may or may not match one's preconception as to what would be expected or as to ideal practice. Furthermore, it may or may not match the employees' point of view, if we were to survey their opinion. More will be said on this subject later, under implications of the data. In any case, certain opinions were voiced by so many employers as to constitute a prevailing attitude in the business community. This is too important to overlook in the interpretation of data. Among these opinions were expressions of the need for more background in business for employees in all types of occupations, and a general shortage of workers with adequate training in mechanical trades. The shortage of top management personnel is expected to become acute in the next five years.

Tables of Data

Further interpretations follow analysis of the detailed data. This detail is summarized in a series of tables in Appendices B, C, and D. These tables were compiled from tallies made separately for each of the four areas of the state. Differences between the several counties were relatively minor, although as might be expected, some types of industry were more frequent in a potato-growing area, for example, while others were more prevalent in wheat country. Businesses interviewed in Bannock County were less frequent in stating need for agricultural background, their usual adjective being "highly desirable". However, their hiring practice reflected strong effort to obtain persons with this background, which in practice therefore amounts to "need".

The differentiation between "desirable" and "necessary" was not specifically requested of employers in Bonneville County, but from analysis of detailed comments recorded by the interviewer, it was found possible in most cases to determine when employers required agricultural training for specific jobs. All cases not clearly holding the "necessary" requirement were classed as desirable. As has been previously pointed out, an individual employer's decision as to degree of importance is at best uncertain. However, the consensus of all employers in a particular business type is more meaningful. The procedure described above, therefore, has tended to strike an average which we have recorded in the present data.

The data from the several counties was combined after comparison indicated rather parallel patterns among these counties. As a result, patterns which appeared and were recognized in the separate areas of the state became even clearer in the composite, due evidently to the confirming effect of greater numbers. In a few cases, a wide variance noted became even wider in the composite, thus identifying business types which are of mixed services or in a transition state of some sort*

A total of 246 different business types with four-digit SICM identification was originally compiled. From this a final list of 120 potentially agricultural types were identified, and are those contained in Tables I through IV in the appendix. The final tallies showed approximately 100 business types which were at least sometimes related to agriculture, with some 85 of clearcut relation.

Key Business Types

Within the four classes of businesses listed, employer opinions varied more widely in some types of businesses than in others. While the median opinion was the basis for deciding into which group a variable business type should fall, some types were very definite. Analysis of high frequencies from Table V identifies the following key business types highly related to agriculture:

0719	Agricultural Services (mainly in field crops)
2063	Beet Sugar Refinery (field services)
47	Transportation Services (stockyards and packing houses)
5099	Nurseries
5252	Farm Equipment Businesses
91	Federal Agencies, with rural branches

Potentially agricultural types which in some studies were found to be agricultural, but in the present study were not related, include the following:

17	Construction Trades
504	Specialty Foods Wholesalers
509	Special Products Wholesalers
5211	Department Stores
55	Automotive Services
61	Savings and Loan Companies
63	Casualty and Title Insurance Companies
6411	Insurance Agents

---

*Some kinds of industries have been severely affected by modern technology, and may soon cease to exist entirely, or be forced to change radically in order to survive.

The above information may be translated into more useful terms, to describe groups of businesses serving the following areas:

A Highly Related
   1. Plant and Soil Sciences
   2. Horticulture Specialties
   3. Selected Animal Sciences
   4. Agricultural Mechanics
   5. Governmental Agencies involved in Farm Management

Similarly the key non-agricultural areas may be re-defined as:

B Not related
   1. Most Trades Areas
   2. Specialty Wholesalers
   3. General Retailing
   4. Automotive Mechanics and services
   5. Personal Loan and Investment Houses
   6. Insurance and Other Business Advisors

A number of business types are agricultural in orientation, but rather variable as to degree and in the present study therefore became classed as no more than moderately supportive of agriculture. Because of this indefiniteness, these industries may be considered especially important as indicators of problem areas of employment and training needs. More will be said hereafter, as to comparison of these indicator businesses, with other key businesses above. These variable businesses include the following:

072	Animal Husbandry Services (0722, 0723, 0729)
0731	Horticultural Services
1711	Plumbing and Heating
201	Meat Products (2011, 2015)
202	Dairy Products (2022, 2024, 2026)
203	Canning and Preserving (2033, 2034, 2037)
2711	Newspapers
35	Machinery Manufacture (3522, 3591, 3599)
421	Trucking (4212, 4213, 4214)
422	Food Warehousing (4221, 4222, 4223)
483	Radio and TV Broadcasting (4832, 4833)
5051	Wholesale Farm Products
508	Industrial Equipment (5082, 5083)
5092	Bulk Petroleum
52	Retail Building Supply (5211, 5212, 5221, 5231, 5251)
54	Retail Food Stores (5411, 5431, 5451, 5462)
602	Banks
6611	Realtors
86	Non-Profit Organizations (e.g. cooperatives)
93	County or Local Government Agencies

The several tables referred to will be understood to represent the present (we nearly said momentary) status of businesses which were considered as possibly related to agriculture in Idaho. Since these result from a heavy interviewing in areas representative of agriculture, they may be considered a reasonable representation for the entire state and adjacent areas. With the pyramidal sampling design used, it is quite possible to project numbers to totals. For the state, however, this projection of data was not maintained in the present study since it was noted that many employers had considerable fluctuation in the number of full-time employees depending on the business fluctuations, so that projection of numbers appeared less reliable than the basic identification of types.

The data does, however, reflect the varying attitudes, opinions, and practices of employers at the time of interview, since this was a fact of the momentary economic picture. Except for the strong key industries mentioned above, however, the amount or degree of agricultural relation is subject to change as a result of varying availability of adequately trained persons, and of other types of economic change.

Key Occupations

As contrasted with grouping of businesses, there is more variance in occupations because economic and labor market factors affect employers' opinion about a given job more widely than on the composite of jobs which determines the business as a whole. Employers were asked what were their hiring policies and requirements. Then they were asked if they were able to hold to these "requirements" or whether they found it necessary to compromise on some. In the majority of cases the employers stated that they compromised. This, of course, is another way of saying that their requirements could no longer be required. Other companies simply changed their statements of standards, and said that certain things were "important" and that applicants who met these were "preferred".

The important effect of this for the present study is that degree of desirability of agricultural background is uncertain but the basic fact of desirability is evident and specific. Thus, we can still classify the occupations represented as regards the agricultural background involved, although to a lesser degree of effectiveness and certainty. With reference to needed agricultural background, these will fall into one of the three categories, "necessary", "desirable", or "not necessary".

Again the details are summarized separately for each industry, in Tables VI through VIII in Appendix D. Lists of occupations have also been totaled among the several business categories.(Tables IX through XI) This composite listing, being a type of statistical averaging, will tend to overcome local fluctuations in business. It may thus be a more useful list for assessing general training needs, and may also relate more conveniently to studies in other states. For the individual who is interested in assessing his opportunity in a given type of business, however, the more detailed list is more useful.

Occupations which require agricultural background, and on which there was high agreement among employers, may be extracted from composite Table IX of Appendix D. These key occupations include the following for which at least 75% of the cases were rated "necessary".*

		(f) Nec.	(f) Des.	Ratio: Nec. to Des. %
040.081	Agronomist	11	1	92
169.168	Office Manager	22	4	85
189.118	General Manager	56	9	86
202.388	Stenographer	15	1	94
250.388	Salesman, Real Estate	16	1	94
424.883	Sprayer, Agricultural	12	0	100
421.883	Farm Hand, General I	7	1	88
421.887	Farm Hand, General II	8	1	89
521.885	Meat Grinder	29	1	97
529.687	Food Sorter	19	2	90
920.137	Packing Foreman	7	0	100
920.885	Packager, Machine	6	2	75
920.887	Packager, Hand	10	1	91
922.887	Laborer, Stores	26	7	79

Additional occupations strongly related to agriculture, yet for which the necessity of training was not so heavily stressed by employers, may also be extracted from composite tables IX through XI. These indicator occupations include:

163.118	Sales Manager	13	16	45
180.118	Agricultural Field Man	19	6	76
183.118	Branch Manager (or Production Superintendent)	55	30	65
185.168	Service Manager	49	19	72
210.388	Bookkeeper	73	53	58
219.388	Billing Clerk	36	24	60
223.387	Parts Clerk	20	14	59
277.358	Salesman, Farm Supply	24	18	57
292.358	Salesman-Driver	41	31	57
299.138	Department Manager	19	13	59
466.887	Livestock Caretaker	12	15	44
624.281	Farm Equipment Mechanic I	19	9	68
624.381	Set-Up Man, Farm Equipment	12	5	71
638.281	Maintenance Mechanic	17	12	59

---

* The identification numbers at the left will be recognized as the D.O.T. code numbers. The incidence of "necessary" and of "desirable" respectively, are listed at the right to indicate the high agreement and the actual numbers are not so important since they represent different total numbers for different kinds of business. The percentage is quite indicative, however.

The key occupations may be translated generally into two groups. One is a group of activities in which minor decisions must be made on the basis of some agricultural acquaintance. The second is a group of supervisory occupations in which decisions of a major sort require knowledge of agriculture. The sales aspect also appears in this latter group.

The indicator occupations include two groups like those above, but with the public contact aspect even more evident. There also appears a third group which could be described as a specialty agriculture group. This title refers to the fact that these occupations require more intensive knowledge primarily limited to one of the four common areas of agriculture, rather than a more superficial but general knowledge encompassing all four phases of agriculture, such as is desired for the other groups.

INTERPRETATIONS AND CONCLUSIONS

At this point in the research sequence there is always a major transition. Up to this point the reports should have been descriptive and objective. Specific decisions were made and for specified reasons; procedures were established; field conditions were encountered; modifications were recorded; and data was tabulated and reported. Many research efforts stop at that point, perhaps under the misconception that all stages of research effort must be objective stages. In such cases the section titled "conclusions" becomes merely a statement, or at best, a re-statement, of the summary of results. Those findings, however, must be the point of departure for the last two stages, the subjective steps which are a characteristic strength and value of applied research.

It therefore must be understood that the material which follows may be parallelled by other interpretations from analysts with differing perspective for the problems. Nevertheless, it is clearly an obligation of the original researcher, who after all has been closest to the research effort he coordinated, to state his interpretations and recommendations. This serves several purposes. One is to provide basis for preliminary action by those persons and agencies who do not have the background to make interpretations but who meanwhile need to make policy decisions on these matters. Another purpose is to provide a frame of reference for the criticisms of those analysts who see alternative interpretations and wish to detail their differences. In these ways therefore, both the implementation of practical policy, and the progress of pure knowledge, are facilitated.

Rationale of Interpretation

In the view of the present analyst, interpretation is a process of reconstructing the meanings which were at once concentrated and obscured by the averaging process or other statistics used in the study. Thus in the present study, of 703 individual business types interviewed, 457 showed some relation to agriculture, while grouping by averages would erroneously indicate that 543 out of the total were related to agriculture. (Tables I through V, Appendix B)

Likewise, throughout the study, the basic groupings and identifications are based on the policy of the majority of employers in each industry. This "statistical basis" for identification must not obscure two modifying factors contributing. One is the deviation from the majority or average policy; in some types of business there may be considerable variation among employers' policy.* The second factor is that in small companies an employee may need a more diverse background, including several areas of agriculture, whereas in a large company the employee in the same title may need none of this because he has assistants who provide that area of knowledge. Also, the large companies may be in a position to require college degree training, while the small company must pay for experience instead.

The foregoing factors are among those which make the tentative lists above subject to further interpretation and possible minor changes in other counties or for the state as a whole. They should also be interpreted in the light of the employee pool at a given time. If the labor pool includes a large number of qualified workers, employers will tend to set higher standards as to amount of education. Conversely, if the labor pool is depleted, employers will be pressed into hiring employees with less training in any positions for which it is safe to do so. In either case, however, the survey gives good information as to the areas of training important to the economy and thus of value to the student.

When interpreting solicited data, that is, from questionnaires or interview questions, care must of course be exercised in evaluation of answers which occur frequently. Their high frequency may be an artifact of the type of (leading) questions asked. In the present survey, great effort was made to structure the questions, their sequence, and the interview approach so as to give no lead to the respondent, but rather to encourage his free response regarding his own perspective of his personnel needs. The resulting high frequency of spontaneous comment on certain matters is thus very significant.

Employers concurred, for example, in their reference to employees' general deterioration of attitude toward conscientiousness in their work. Many employers felt that this tendency toward irresponsibility was related to the over-emphasis on the academic aspects of schooling which they feel is a general attitude nowadays. Other sources of opinion support this point that students are made to feel a college degree is a necessary but automatic guarantee of a high-paying position, with a minimum of labor or effort in the duties of the work. The fact that this is an unrealistic attitude has not prevented it from developing, and having a definite influence in the work and attitude of tradesmen as well as workers in the professions.

---

*Reasons for this variation may be hard to determine; in some cases the location of the business, near the center of town for example, may make the policy one of less agricultural emphasis.

One further point of intepretation relates to evidence of a possible employers' bias. It is possible to interpret that employee attitudes are consistently negative in certain communities because of generally depressed wage scales in those communities or in certain types of business. On occasion, employees have expressed the belief that the profit motive of employers has tended to interfere with adequate wage increases and some have stated that this condition tends to encourage stronger union activity. It may be important to assess general employee outlook along with employers' biases, in order to accomplish a realistic interpretation of the data.

Conclusions Regarding Occupations

From the data we can conclude that there presently exists a specific shortage of mechanics and related workers. Also strongly needed (but without such specific evidence of shortage) are several service occupations, such as sprayer, sorter, and packager. More general needs, and in fact more widespread needs, are competent sales and contact personnel, such as stenographer, parts clerk, field men, livestock caretakers, and bookkeepers. It should be explained that these persons may need primary knowledge of agricultural products or services but also they have a secondary duty of communication with the public; or conversely, they may have a primary duty of contact with the consumer, but a secondary duty of knowledge in agriculture. The key point is that always they have both a primary and a secondary field of obligation.

The above personnel could be otherwise described as persons having a certain degree of responsibility for the business enterprise and its relationship to the public, not merely a responsibility for the skills or tasks of a trade or job. This gives a certain perspective to the greatest shortage evidenced, which is that of increasing shortage of workers who intend a permanent career in agrarian fields, and usually with a supervisory or managerial potential.

A growing shortage in a job field of relatively good advancement and pay potential, is actually evidence of an information gap, and leads to the conclusion that agrarian employment has not been properly described and publicized. It would seem that this is true for educators, as well as the general public, and calls for more public relations effort.

A final conclusion regarding occupations is that although the agricultural needs in businesses and occupations range from specific to general, they usually do so within only one, or at most, two of the four main competency areas of agriculture. Thus for example, most workers in feed and seed companies needed background only in plant science and animal science, and not in agricultural mechanics, nor in farm management areas, while the latter two areas might be the only ones important for most occupations in farm machinery companies.*

---

*That this split competency circumstance might not be true for top management or college-degree employees is outside the scope of the present study, as has already been mentioned.

From the present study it is not possible to conclude in any very definite or useful way, what percentage of agricultural business employees need agriculture. This depends too greatly on employer policy and other fluctuating factors. It is also difficult to see what value could be gained from any tentative conclusion* as to the percent of total labor force which is in agriculture, since this is also found to depend on state and regional conditions at the moment. For both of the above points, perhaps it is sufficient for us to show the conclusion that agrarian occupations are a major portion of the labor force, and will continue to be so.

Conclusions Relating to Research

A definite conclusion is that for more effective study, competencies in occupations should be defined in a way which can more readily be determined by the individual employer. In studies thus far, much of the decision was left up to the employer without giving him sufficient basis for making the decision. Evidence suggests that competencies should be defined by their basic or specific qualities, rather than in general relationship to agriculture. Thus the interviewer might ask about need for knowledge of plant diseases, or knowledge of animal nutrition, rather than whether the employer has an opinion on the nebulous question as to whether "agricultural training" is desirable. Findings also suggest that the several occupations should be divided into basic competencies as the basis for their category, and should not be limited to agriculture topics to the exclusion of business, speech, and personality skills, and certain trade and industry experiance.

A second research conclusion is even more far-reaching. The findings and experience of the study lead to the conclusion that the first objective of the Ohio Schedule (and of our study) is stated so generally as to be impossible to accomplish. In that form it therefore seriously hampers our effort to meaningfully achieve the remaining objectives based on it. There is no such thing as a complete and unchanging list of agriculturally related businesses, much less such a list of occupations. It would seem the objective needs to be re-stated in some different form such as: "To identify which occupations among a standardized composite list, are important to agriculture in the area under study." (This would in turn require an improved definition of agricultural relationship such as discussed above.) The composite list should contain just those occupations which have been found of major importance to agriculture in some geographic area, or which might strongly be expected to become of major importance. This approach can give comparative data between regions as well as data which can effectively be followed up periodically for predictive purposes. It will provide a stable basis for determining more refined kinds of information such as numbers of employees and similar information related to these key occupations.

Finally, in the effort to make projections it is easier to jump to conclusions than it is to arrive at results. However, the only safe conclusion is that with the degree of refinement available to date it is not possible to project from a small sample accurately unless the small sample represents a large percentage of the cases. Further, it is not effective to project future needs from employer opinions or estimates except in a very general way. Objectives which attempt to do so are unrealistic objectives.

---

* This term is in common use among researchers, to mean "a certain tentativity."

IMPLICATIONS AND RECOMMENDATIONS

We have considered implications to be a step beyond conclusions, and as such they include a quality of anticipation of general tendencies. Furthermore, they may project, not only in the direction of agrarian business, but also in that of education, and of research.

Implications for Agriculture

From the exploratory study so far described, and from the points of similarity in the findings of other studies, we may infer several things about agrarian occupations. In the past, they seem to have developed and changed rather haphazardly as farming became specialized and was served more and more by farm service industries. In the future, for a healthy business climate, the agricultural and technical knowledges important to occupations need more attention, indeed more specific identification. Perhaps they need this without any preconception as to the agricultural business involved, or whether in fact it is agricultural. If tradespeople or business people should be the first to recognize and approach the problem, then they can be expected to adapt related knowledges such as agriculture to their perspective of the needs. If the agriculturists first attack the question, they are in a position to adapt the trades techniques to their view of the needs. It could easily regress into a competitive matter of "who will call the shots". Evidence is that agriculturists have not been sufficiently involved in the past to provide the proper balance of interest and other considerations which are needed for most healthy economy. In any event, the total agrarian economy may expect to suffer in prestige and in effectiveness if adequate determination is not made, of the trainings needed.

Implications for Education

Agriculturists may take note of the findings of studies in some other states, where specializations have been instituted in Horticulture, in Agricultural Mechanization, etc., in addition to (or instead of) the traditional courses in diversified high school agriculture.(21) The interest in expansion of the business areas has been noted. Extension of the supervised experience portion, (even to an extent similar to apprenticeship) has been advocated by some employers. The distributive education programs have used such an approach, and may be worthy of some emulation in agricultural programs.

There are several strong implications for curriculum and training arising from employers' responses in the present study. Perhaps the strongest arises from their expression of a desire for more emphasis on trade school curricula and a return to more respect for careers in skilled trades. This is consistent with the fact that at least 80% of the students in school are best fitted by aptitudes and interests for careers other than the professions. In terms of curriculum planning, this means that the majority of high graduates will seek trade school or junior colleges in which they may find many practical courses oriented toward trades and business, rather than toward four-year degree institutions.* A two-year, or Associate of Arts degree has been favored by some.

A strong point too often overlooked in training programs, is that an employee may be hired for a job not requiring agricultural background, but that for advancement to a higher position, agricultural training is needed. This "entry need" must either be provided prior to graduation, or be available in some form of adult or post-high school training program.

Whatever findings are made in the agrarian occupations field should preferably be finally reported, not in long lists of occupations, but in a succinct bulletin form. This form will be utilized more effectively by counselors, vocational agriculture teachers, teachers in general, administrators, students and their parents, newsmedia, and the general public. We shall try to present this format in our recommendations. It is conceded that studies which conclude by listing clusters of related occupations are also undergoing risk of misinterpretation or of no interpretation. It is difficult to interpret cluster lists unless the common item used as a basis for cluster is clearly identified, since another analyst would obtain different clusters using different curricular topics or other item as a basis.

Implications for Research

Many of the interpretations and implications noted thus far should have influence on plans of any future research. For example, the considerable variation among employers may lead to a consensus that a certain competency is not needed, when in fact it is. An employer is a layman in the matter of education, so that to ask for his general decision in the matter of training needed is a sure way to increase error variance. This is most likely to be skewed in the direction of negative consensus, as this is the most usual direction of reaction to an unfamiliar field. Time spent on a good set of specific criteria and competencies in agriculturally related areas would be an invaluable forward step therefore. It would allow use of specific questions by which could be obtained much more knowledgeable and reliable employer opinion.

---

*A high school survey conducted by the present analyst has found that over 60% of the students desire trade-technical schooling. This study was written informally and is not in the bibliography. It may be identified as Special Bulletin No. 1, High School Vocational Interest Survey in Canyon County. 1967.

The experience of the present study lends support to the use of four competency areas recommended by Ohio, but with the specific further breakdown just mentioned. The use of specially trained interviewers was found to be quite effective in the present study, and in fact their interview records have included numerous notations which would be valuable in the endeavor of defining competencies.

Grouping of occupations, as in the eight types of Hoover, or the thirteen "natural" groups of some other studies, may have some research merit, if these could serve in some way as indicators of the total pattern. It was early established that a comprehensive list of agricultural occupations would only be possible from a similarly comprehensive list of agricultural businesses, and that this is not possible in a practical way. Further, two sources of systematic variance remain for additional decision. The list of occupations would vary depending on the degree of agricultural relatedness selected for the businesses, and also for the occupations. Then it varies depending on the extent of interrelation selected. Thus we may quite arbitrarily define businesses in three degrees of relation, and occupations in two degrees, and then decide whether it is meaningful to include both degrees of occupation at all three levels of business. Whatever our decision, error variance within the groupings still remains.

The research implication would seem to be that in lieu of grouping, a selection of certain key business types, and certain key occupation types to use as base measures would be more effective. Certain additional indicator businesses and indicator occupations could then be compared with these keys, as "business barometers" which could be rechecked periodically for better projection data.

A final implication is that such approaches as above, or others, should be made on a smaller basis, rather than to attempt to cover the field each time, now that the full exploratory phase has been completed. Everyone of experience knows that "You do not send a combine when there's gleaning to be done". There are important things to be learned at the "grass roots" level, and much of this information would lend itself to small, manageable research investigations by persons and agencies in the various communities. Cooperative efforts of such kind are urgently indicated, with the understanding that information and experience of such agencies as the State Research Coordinating Unit will be available in aid of such efforts.

Recommendations

It would be well to promote greater public knowledge of the favorable opportunities in agrarian business employment, and of the value and respect in these occupations. This should be addressed both generally to the public, and specifically to those who advise students as to choices in school and career.

To best benefit the agrarian economy, and pending more specific determinations of curricular needs, it is recommended that effort be made to offer material in course areas mentioned in this study. This should be made available on a statewide basis both at the high school and the post-high school levels in any way which can be made effective. Even where these are presently offered, it may be possible to schedule so they may be available to more people, especially to those who hold jobs. These course areas evidently ought to include the following areas, among others:

a) Business practice
b) Effective speaking and writing
c) Sales and public relations
d) Plant science specialties
e) Animal science specialties
f) Agricultural mechanics

Study should be made of the specific competencies needed in key occupations, as basis for curricular decisions. Such study or series of studies may be extended to competencies of other important occupations as opportunity arises, and may be designed to identify curricular areas which are common to many important occupations in Idaho. Prior identification of all the agriculturally related occupations is not a necessary step, although it might be a convenient means of selecting a segment of study. Likewise a specific prediction as to number of new employees needed, while very helpful to policy people, is not a necessity for research extensions. As a matter of fact, this identification phase for curricula should not be limited to agriculturally related occupations, but findings should lead to an estimated total training need for the curricular subject field in the various communities.

Survey of the vocational course interests of students and workers would be a valuable adjunct to the above study and could easily be made for selected groups.* To obtain total survey of even one community, on the other hand, involves difficulties which require much careful research design, and a considerable time and effort to complete. Such ambitious effort, therefore, should be done only by agency coordination.

There is room for much study of the traits and interests of workers in the various vocations, especially as this relates to their more effective choice of training for a career which will be most satisfying to them.

The reader should feel free to extend this list of five recommendations, should he see further needs in an area with which he is especially familiar.

---

*Note again the reference to a high school study on page 30 of this report.

SUMMARY

This reports a study in which it was found that agriculturally related occupations are a large and important segment of the employment. Reported are specific findings as to types of jobs, training needed, and means for further study of these matters.

Orientation

The prime objective of this study is identification of agriculturally related occupations, and of problems relating to these. A strong collateral purpose, in recognition of Unit obligations in such a complex study as agrarian employment, is demonstration of research models effective for survey data.

The introduction covers the importance of local studies, with recognition of the lack of popular appreciation of the value of agrarian occupations. The methods and findings of several representative studies in other states are scanned, and studies in Idaho noted. The merits of various methodology are compared, including reference to other studies, and with reference to needed objectives. It is noted that a semi-stratified survey research design was favored in most studies, with frequent recourse to the expert opinions of agricultural authorities, and with dependence on large numbers of agriculture instructors, or of paid laymen, to conduct the personal interview. Various degrees of statistical sophistication were applied, and ambitious objectives established, with only the most basic of these possible of early accomplishment. Usual results were lists of businesses and of occupations, often grouped according to some arbitrary or traditional format, sometimes grouped by means of averages or totals. Accepted standard definitions are used in most cases.

Design

The design of the present study is described with acknowledgment of counsel from the experience of other studies. The methodology developed includes several changes in design with intent to improve certain effects shown by prior designs. Thus the study was restricted to a few of the more realistic objectives. Lists of businesses to be considered were obtained from as broad a spread of sources as possible. Identification of businesses as agricultural was a result of survey data, rather than resorting to pre-selection based on expert opinion only. Likewise, identification of agricultural occupations resulted from total data, rather than requiring interviewers to make selective decisions during the interviews. Revised definitions were developed both for agricultural businesses and for agricultural occupations. The stratification was specially designed as a pyramidal sample, for improved efficiency and completeness. Similarly, the interview schedule was specifically designed to close as a conic sampling of employer bias with care to reduce contamination from possible interviewers' bias. Only skilled, experienced, and highly trained counselors were used as interviewers, and a manual specifically prepared for the present study was provided for them. Provision was made for unobtrusive notation of commentaries or special circumstances which appeared at any interview. Statistical analysis and interpretations were planned with actual and realistic, rather than blind or automatic relation to circumstances. In short, the study was undertaken with as much circumspection as possible.

Results

Results include lists of businesses in four groups ranging from highly related to non-agricultural. Occupations are listed in relation to these businesses, and with two degrees of competency either "necessary " or "desirable", as background. The extent to which each entry is clearcut and definite, or variable, is noted. Some 700 interviews were obtained. The resulting data serves to identify about twenty-five distinct types of businesses which are highly related to Agriculture in Idaho, and about an equal number of additional businesses which are strongly supportive. In addition, there are some thirty-five business types which have a more casual or occasional relationship to agriculture. This means there are over 85 different types of business which this study identifies as having some need for employees with agricultural background. A good portion of these businesses necessarily require several employees with very specific agricultural training. A total of about 250 agricultural occupations were identified.

An attempt was made to record agricultural competencies most needed within a year, and to tally expected job openings, but employers' uncertainty made this data questionable, and it has not been analyzed. A need for improvement in identification and definition of competencies over that used in prior studies, was evident.

Interpretations

Conclusions were several. The study showed that extensions and improvements in training of agrarian workers are suggested in certain new directions, and strong implications appear for additional changes which appeared as trends but were not conclusive from this one study. In general the training should be broadened in other subject fields, particularly business management and sales relations.

The importance of agrarian occupations was strongly reaffirmed, and certain present shortages of workers and worker skills were noted, among the most critical of which was really well-trained mechanics. Employers feel a need for more emphasis on trade school curricula and a return to more respect for careers in skilled trades. Another strong implication is that many employees would benefit from the crop and soil areas of a vocational agriculture curriculum but have no need for the animal husbandry area, or conversely. A final implication is that there are important things to be learned at the "grass roots" level, regarding school and curricular needs and much of this information would lend itself to small, manageable research investigations by persons and agencies in the various communities.

Recommendations

Suggestions for improvement in study design, and recommendations for further study are included. Also recommended are certain training and employment policies which would be beneficial to the agrarian economy pending later studies and more exact information. These policies include the following:

1. Emphasize the value and respect of agrarian occupations.
2. Emphasize the availability of agrarian positions and good advancement possibilities
3. Make it possible for students to concentrate on one of the four aspects of agriculture rather than requiring all.
4. Consider extension to a fifth area, namely Horticulture.
5. Make available other course areas to those preparing for one aspect of agriculture; these other areas include:
   a) business practice
   b) effective speaking and writing
   c) sales and public relations
   d) others as appropriate
6. Establish curricular improvements in specific competency areas indicated by this and other studies.
7. Continue and extend study of curricular needs in agrarian occupations with possibility of identifying basic competencies needed for groups of occupations needing these.
8. Extend training upward to serve beyond high school level.

A SELECTED BIBLIOGRAPHY

1. Bailey, Joseph K. Non-Farm Agricultural Employment in West Virginia with Implications for Vocational Education Programs. Division of Vocational, Technical and Adult Education, Charleston, West Virginia, January, 1965.

2. Baker, Richard A. A Study of Employment Opportunities in Off-Farm Agricultural Occupations in Alabama. School of Education, Department of Vocational, Technical and Practical Arts Education, Auburn University, Auburn, Alabama, April, 1965.

3. Barwick, Ralph P. Identification of Off-Farm Agricultural Occupations. School of Agriculture, University of Delaware, Newark, March, 1965.

4. Brown, Bert L. Training Needs of Workers in Business Associated with Agriculture. State Board for Vocational Education, Olympia, Washington, 1959.

5. Burgener, V. E. "Agenda for Vocational Education", Education Magazine. 52: 391-3, May, 1964.

6. Campbell, A., and G. Katona. "The Sampling Survey, A Technique", In L. Festinger, and D. Katz, Research Methods in the Behavioral Sciences. New York: Holt, Rinehart and Winston, 1953.

7. Center for Research and Leadership Development in Vocational and Technical Education. Summary of Research Findings in Off-Farm Agricultural Occupations. Ohio State University, Columbus, Ohio, August, 1965.

8. Center for Vocational and Technical Education. Agricultural Supply-Sales and Service Occupations. Ohio State University, Columbus, May, 1965.

9. Christensen, Howard H. Employment Opportunities in Selected Non-Farm Businesses and Government Agencies as Related to Agricultural Training or Background. College of Agriculture, University of Nevada, Reno, 1965.

10. Clark, Raymond M. Need for Training for Non-Farm Agricultural Business. Department of Teacher Education, Michigan State University, East Lansing, December, 1959.

11. Curtis, C. M., and Anthony Mumphrey. Occupational Opportunities and Training Needs of Youth for Non-Farm Agricultural Jobs in the Shreveport-Bossier City Area. Department of Vocational Agricultural Education, Louisiana State University, Baton Rouge, March, 1965.

12. _______. *Occupational Opportunities and Training Needs of Youth for Non-Farm Agricultural Jobs in the Monroe-West Monroe Area.* Department of Vocational Agricultural Education, Louisiana State University, Baton Rouge, April, 1965.

13. _______, and J.H. Hutchinson. *Occupational Opportunities and Training Needs of Youth for Non-Farm Agricultural Jobs in the Lafayette Area.* Department of Vocational Agricultural Education, Louisiana State University, Baton Rouge, May, 1965.

14. _______,_______. *Occupational Opportunities and Training Needs of Youth for Non-Farm Agricultural Jobs in the New Orleans Area.* Department of Vocational Agricultural Education, Louisiana State University, Baton Rouge, April, 1965.

15. Cushman, Harold R. *et alles*. *A Study of Off-Farm Agricultural Occupations in New York State.* Agricultural Education Division, Cornell University, and Bureau of Agricultural Education, State Education Department, Ithaca, New York, January, 1965.

16. Department of Agricultural Education. *Technical Education Needs of Persons Engaged in Agricultural Occupations.* Pennsylvania State University, University Park, Pennsylvania, January, 1965.

17. Department of Agricultural Education. *A Study of the Skills Needed by Vocational Agriculture Students for Employment in Farm Machinery Businesses.* East Texas State College, Commerce, Texas, 1964.

18. Dillon, Roy D. *Comparison of Certain Abilities Needed by Workers in Licensed Nurseries and Licensed Ornamental Horticulture Businesses.* Division of Applied Arts, Morehead State College, Morehead, Kentucky, March, 1965.

19. _______, and Paul S. Cain. *Employment Opportunities and Usable Agricultural Skills in Non-Farm Agricultural Occupations in Appalachia.* School of Applied Sciences and Technology, Morehead State University, Morehead, Kentucky, 1966.

20. Dupy, Cleo A., and William L. Hull. *Problems of Implementing Agricultural Occupation Programs in Twenty-eight Selected Vocational Agriculture Departments.* Vocational Research Coordinating Unit, Department of Agricultural Education, Oklahoma State University, Stillwater, October, 1966.

21. Frazer, George E. "A Four Phase Curriculum for Farm Related Occupations", *The Agricultural Education Magazine.* 37: 174, January, 1965.

22. Freier, Ernest E. *The Minnesota Agricultural Off-Farm Occupational Opportunities and Training Needs*. Mankato Area Vocational-Technical School, Mankato, Minnesota, May, 1965.

23. Griffin, Warren L. *Agricultural Occupations Other Than Farming in Missouri*. Agricultural Education Department, University of Missouri, Columbia, Missouri, 1964.

24. ______. *The Nature of Agricultural Occupations, Other Than Farming in Saline County, Missouri*. Number 91, University of Missouri, Office of Publications, Columbia, November, 1964.

25. Harral, Stewart. *Keys to Successful Interviewing*. University of Oklahoma Press, Norman, Oklahoma, 1954.

26. Heaney, D. S. *Vocational and Technical Training Needed for Off-Farm Agricultural Occupations in Selected Communities of Montana*. Unpublished Doctoral thesis, Pennsylvania State University, University Park, Pennsylvania, 1966.

27. Hoover, Norman K. *Handbook of Agricultural Occupations*. Danville, Illinois: Interstate Printers and Publishers, Inc., 1963.

28. Judge, Homer V. *Employment Opportunities and Needed Competencies in Off-Farm Agricultural Occupations in Massachusetts*. Division of Vocational Education, Massachusetts Department of Education, Boston, June, 1965.

29. Kahn, Robert L., and Charles F. Cannell. *The Dynamics of Interviewing*. New York: John Wiley & Sons, Inc., 1957.

30. Kerlinger, Fred N. *Foundations of Behavioral Research*. New York: Holt, Rinehart and Winston, Inc., 1964.

31. Knuti, Leo L. *Vocational and Technical Education Needs of Montana Youth and Adults*. Agricultural Education Department, Montana State University, Bozeman, 1963.

32. Lawrence, John Allen. "A Study to Determine Employment Opportunities and Needed Training in Off-Farm Agricultural Occupations in Twin Falls, Idaho." Unpublished Master's thesis, University of Idaho, Moscow, Idaho, 1966.

33. Long, Gilbert Andrew. "A Study of the Vocational Opportunities and Training Needs for a Rural Community of Northeastern Washington." College of Education, Washington State University, Pullman, 1965.

34. Luther, Carter Van. "A Study of Employment Opportunities Needed for Off-Farm Agricultural Occupations in Jerome, Idaho." Unpublished Master's thesis, University of Idaho, Moscow, Idaho, 1965.

35. Martin, W. H., and Philip Masley. *Non-Farm Agricultural Occupations in Connecticut*. University of Connecticut, Storrs, Connecticut, April, 1965.

36. Michigan State Department of Public Instruction. *A Survey of Agricultural Occupations in Michigan*. Lansing, Michigan, February, 1965.

37. Mondart, C. L., and C. M. Curtis. *Occupational Opportunities and Training Needs of Youth for Nonfarm Agricultural Jobs in the Baton Rouge Area*. Department of Vocational Agricultural Education, Louisiana State University, Baton Rouge, March, 1965.

38. _______, _______. *Occupational Opportunities and Training Needs of Youth for Nonfarm Agricultural Jobs in the Alexandria-Pineville Area*. Department of Vocational Agricultural Education, Louisiana State University, Baton Rouge, January, 1965.

39. _______, _______. *Occupational Opportunities and Training Needs of Youth for Nonfarm Agricultural Jobs in the Metropolitan Areas of Louisiana*. Department of Vocational Education, Louisiana State University, Baton Rouge, February, 1965.

40. _______, _______. *Occupational Opportunities and Training Needs of Youth for Nonfarm Agricultural Jobs in the Lake Charles Area*. Department of Vocational Agricultural Education, Louisiana State University, Baton Rouge, May, 1965.

41. The National Center for Advanced Study and Research in Agricultural Education. *Report of Research Coordination Conference on Agricultural Occupations*. The Ohio State University, Columbus, 1963.

42. The National Center for Advanced Study and Research in Agricultural Education. *Report of the Second Research Coordination Conference on Agricultural Occupations*. The Ohio State University, Columbus, 1964.

43. New York State Education Department. *Vocational and Technical Education in the Monroe County Area*. Albany, New York, 1964.

44. New York State Education Department. *A Summary of a Survey of the Employment Opportunities and Competencies Required for Entry in Selected Occupations in Agriculture Businesses in Three Communities in New York State*. Albany, New York, 1964.

45. Phipps, Lloyd J., *et alles*. *Technical Education in and for Rural Areas*. Vocational and Technical Education Department, College of Education, University of Illinois, Urbana, June, 1964.

46. Public Schools of Tri-County Area. *Final Report, Vocational Education Study--Allegany, Cattaraugus, Chautaqua Counties.* New York State Education Department, Albany, New York, 1964.

47. Risley, Robert F., *et alles. Five County Area Vocational Education Study.* New York State School of Industry and Labor Relations, Cornell University, Ithaca, New York, (1965).

48. Rodgers, John H. *Occupations of South Carolina's Vocational Agricultural Students Completing a Prescribed Course.* Agricultural Education Department, Clemson University, Clemson, South Carolina, June, 1964.

49. Schank, Dean R. *Study of the Off-Farm Agriculture Occupations in Utah's Salt Lake and South Davis Counties to Determine Educational Needs.* Unpublished Master's thesis, Utah State University, Logan, 1964.

50. Scheid, Daniel W. *The Occupational Trends of Graduates and Dropouts of Fort Atkinson High School.* Vocational Agricultural Department, Department of Agriculture and Extension Education, University of Wisconsin, Madison, 1965.

51. *Standard Industrial Classification Manual.* Executive Office of the President, Bureau of the Budget, Washington, D.C.: U.S. Government Printing Office, 1957.

52. State Board for Vocational Education. *A Study of Agricultural Occupations Other Than Farming and Ranching in Colorado.* State Office Building, Denver, Colorado, 1965.

53. State Board for Vocational Education. *A Study of Nonfarm Agricultural Occupations in Kansas.* School of Education, Kansas State University, Manhattan, *ca.* 1965.

54. State Board for Vocational Education. *Training Needs of Workers in Business Associated with Agriculture.* Olympia, Washington, 1959.

55. State Board for Vocational Education. *A Study to Determine Employment Opportunities and Needed Competencies in Agricultural Occupations Other Than Farming.* Olympia, Washington, *ca.* 1966.

56. State Education Department. *Interstate Project in Evaluation of Secondary Programs in Vocational Ornamental Horticulture.* New Hampshire State Department of Education, Concord, New Hampshire, 1966.

57. Stevenson, William W. *A Study of Employment Opportunities and Training Needs in Off-Farm Agricultural Occupations in Oklahoma.* State Board for Vocational Education, Oklahoma State University, Stillwater, December, 1965.

58. Sutherland, S. S., and O. E. Thompson. Training Required by Workers in Agricultural Business and Industry. Department of Agricultural Education, University of California, Davis, 1957.

59. Supplement to 1957 Edition Standard Industrial Classification Manual. Executive Office of the President, Bureau of the Budget, Washington D.C. : U.S. Government Printing Office, 1963.

60. Tenney, A. W. "Agricultural Occupations", Agricultural Education Magazine, 35: 211, April, 1963.

61. Thurstone, L. L. Multiple-Factor Analysis. Chicago: University of Chicago Press, 1947.

62. Travers, Robert M. W. An Introduction to Educational Research. The Macmillan Company: New York, 1958.

63. University of Delaware. Agricultural Occupations Other Than Farming in Delaware. School of Agriculture, University of Delaware, Newark, 1965.

64. U.S. Department of Labor. Dictionary of Occupational Titles, Volume I, Definitions of Titles. 3rd edition, Washington: Government Printing Office, 1965.

65. U.S. Department of Labor. Dictionary of Occupational Titles, Volume II, Occupational Classification and Industry Index. 3rd edition, Washington: Government Printing Office, 1965.

66. Van Loh, Frederick Alvin. Competencies in Agriculture Needed by Males Employed in Retail Fertilizer Distribution. Department of Education, Iowa State College of Science and Technology, Ames, n.d.

67. Vivian, Neal E. "Distributive Education", The American Vocational Journal. 42: 37, March, 1967.

68. Vocational Research Coordinating Unit. Job Title Profiles in Off-Farm Agricultural Occupations. Stillwater, Oklahoma, 1966.

69. Walker, Helen M., and Joseph Lev. Statistical Inference. New York: Holt Company, 1953.

70. Warmbrod, J. Robert. Technical Education in and for Rural Areas. Division of Agricultural Education, University of Illinois, Urbana, June, 1964.

71. Woodin, Ralph J. "What Parents Want", Agricultural Education Magazine. 37: 163, January, 1965.

72. Young, David B. Employment Opportunities and Training Requirements in Agricultural Occupations in Toledo, Ohio and Surrounding Area. Ohio State University, Columbus, 1962.

APPENDIX A

MANUAL FOR INTERVIEWERS

Study of Selected Occupations in Idaho

INTRODUCTION

This manual was prepared as a guide for interviewers who will be engaged in field contacts with employing establishments in a study of specific occupations in Idaho. This study is being conducted by the State Occupational Research Unit at the University of Idaho, in cooperation with the State Office of Vocational Education.

Preparation of the manual was necessary for several reasons. First, certain types of information were deemed important and necessary if the basic objectives of the study are to be realized. An interview schedule, (reproduced in the appendix to this manual) was prepared to insure that all pertinent questions would be asked during each interview. Second, and most important, the sequence of the questions, and the over-all rationale of this sequence in the schedule must be clearly understood by each interviewer. Also, since several interviewers will participate in the study, some standardization of procedures seems necessary to insure comparability of the results. The contents of the interview schedule, its over-all rationale, and specific instructions for its use in the field are the main themes of this manual.

The main objective of this study is to identify those agriculturally related occupations which are found in the Idaho economy. Therefore two points of procedure are to be emphasized. First, the rationale demands that we do not in any way bias the person we interview, nor through suggestion inadvertently encourage slanted replies to our questions. The interviewer will realize that this requires the study to not be labeled as identifying agriculturally related occupations.

It is true that at some point in the interview we must ask questions specifically relating to farm experience and vocational agricultural training. The design is such that these questions are placed at the end of the interview, and their answers will be carefully referred to earlier questions. Therefore on initial contacts the interviewer should avoid disclosure, by the use of a more general statement that this is a study sponsored by the University to determine employment needs and training requirements, and that the results will be used to improve programs of vocational education in Idaho high schools and junior colleges.

The second point of procedure concerns the sequence and its effect. Those questions which are near the end of the form refer back to earlier questions in such a way as to enable certain "checks" and "cross-comparisons" as the interview proceeds. Unless handled carefully, this might give the employer or respondent the feeling that we are trying to trap him with inconsistencies in his answers. It is therefore important that you know the interview schedule and the procedure almost "by heart". We intend that the interviewer should follow a definite rationale in such a manner that it seems to the interviewee or employer as a rather casual and spontaneous interview. Thus we purposely refrained from including questions which would be stated in a rigid word-for-word manner. Consequently any apparent inconsistencies in answers to questions on the interview schedule may be handled in a relaxed, friendly and inquiring manner, rather than with an "Aha, you rascal, I caught you on that one!".

This is an exaggeration, of course, but the point will presently become clearer. The atmosphere would be one of mutual information and enlightenment for both parties to the interview, in an effort to determine information of advantage to both.

PREPARATION

The entire procedure requires finesse and experience on the part of the interviewer in order to obtain full and equivalent data from a full range of employers. All data is to be handled in a confidential manner at all times. Keep the accordian folder with you, so that completed forms may be under control and not lost. Also, additional copies of the interview sheet will be available for instant use.

A rather complete list of employing establishments has been provided, but this must be supplemented by sources for particular locales. Local telephone directories, County Agents, and other sources will from time to time be recommended. This effort will be reduced by the fact that contacts will be limited to certain types of business most likely to include agricultural occupations. This was ascertained from careful screenings earlier accomplished by the Unit staff.

In setting up employer contacts, ask for interview with the person most knowledgeable regarding hiring procedures and worker requirements. It is well to plan interviews so that firms are fairly close together, as exact amount of time needed is not possible to predict. Attention must be given to staging interviews for effective use of time and distance. For example, a business some distance out of town may be scheduled for its opening hour, and an early business such as a garage scheduled ahead of this, in the same direction so as to reduce travel time during open hours. Thus an 8:00 implement repair business call followed by a 9:30 village store, a 10:30 retail business, and a 11:30 service business, is often the best you can achieve.

Interviews should usually not be begun after 4:00 to 4:30 as employers are not as respondent, and you will need this time to check over your day's interviews for order and completeness, and to plan the next day's contacts. Occasionally you will find it necessary to make an appointment for later interview, and such appointments should preferably be set up for an early hour of the day, so as to free the rest of your day's schedule. Also, certain types of business are very rushed at certain seasons and you should keep this in mind when planning the summer's field work.

On occasion also, you will find businesses best to contact in the evening, on a Saturday, or other off hours. It is reasonable to do so, and to permit yourself some time off on another day. However, your assignment to the Unit's work and the necessity of completing certain communities in the field time available, should be an important consideration. Your conscientious decisions on such matters are assumed.

Just prior to the interview, you will initial page one of the interview, and record the firm's name. This and all other entries must be quite legible. Printing of the data is to be recommended unless the interviewer has very legible handwriting, as original sheets will be the basis for all data. No provision for recopying will be made; this is important. Such procedure should not be difficult to follow, however, as the interview should proceed at a conversational pace.

THE INTERVIEW FORM

Referring to the interview schedule in the appendix, there are two pages. They contain the seven basic questions which are to be covered with each respondent. The last portion of page two is not an integral part of the interview schedule. It will be used as a separate sheet, or as card, which can be used repeatedly with successive employers as they answer the last item of Section VII. This supplemental list is designed to inform the interviewee of the actual content of the Vocational Agriculture Curriculum, as better rationale for his answer to the final question.

In use, the interview form is arranged so that page two is upside down on the back of the sheet, and therefore can be used by folding the bottom half of page one upward to expose sections V through VII. In this way, the sheet may be slipped under the tie of the accordion folder which substitutes for a clipboard, and held there throughout the interview.

THE INTERVIEW

Section I

Obtain the business data indicated, which is mainly for identification. The firm name should have been recorded accurately and in its entirety. (Unless the SICM code is on the card, it can be omitted, as it will be assigned later in the Unit office.) Listing of the several functions of the company is very important, because it forms the basis for assignment of the SICM code, and for any corrections of assignment which may be indicated as a result of the interview. The term "services" should be interpreted broadly, to include Sales, Service, Manufacturing, Processing, Purchasing, Warehousing, and perhaps others. In short, describe what the firm actually does for its income.

Section II

This section is the most critical of all, and may consume the most time. Since the primary objective is identification, therefore adequate description must be given. This means that each different type of job must have sufficient description of duties and of skill level so that a future coding from the Dictionary of Occupational Titles (D.O.T.) is clear and certain. Frequently this may require that two or more lines of description are needed.

The difference between job and position needs definition here. There may be several positions in one type of job; the job is to be described and the number of positions is to be recorded for that job. (You are of course aware that the term "position" may be used by many employers as a prestige term, to differentiate "administrative positions" from "clerical jobs". In your conversation therefore, you may refer to the number of workers rather than number of positions.)

Procedure for this Section II is first to ask the respondent for the title of each different job type in the company. As each job is recorded, it will be given a consecutive numbering at the left. Description and number of workers will be entered in appropriate spaces opposite. The total should be entered immediately for each job title, to determine whether all employees are accounted for. This total should be on the same line as the job titles.

Use the job title given you by the employer; however when unusual titles are given, such as "flunky", "girl friday", or "pond monkey", you should see fit to add a common title. Follow titles by a dash mark before the narrative. The best guide we have found for this narrative job description is the four-point job analysis formula developed by the U.S. Employment Service:

1) What does the worker do?
2) How does he do it?
3) Why does he do it?
4) What skill or precision is involved?

For example, a description of "Drill press operator" would be: (What) Drills holes in metal farm machinery parts supplied to his work station. (How) Operates a Case brand electric powered vertical drill press. (Why) To make holes according to specification, such that bolts may be inserted and the parts assembled into a complete machine. (Skill involved) Work is fairly routine, as no fine tolerances are required; operator follows simple markings on parts and simple directions as to sizes of drill bits.

A little practice by the interviewer will enable him to follow these four points almost automatically as a single narrative description. Thus for our purposes this might become: "Operates an electrical vertical drill press, making holes according to design specification, in metal parts on a production line. The routine work involves following simple instructions and markings."

When the job list is completed, the interviewer should quickly total the "T" column; this grand total may determine whether the respondent has inadvertently omitted a few employees or jobs. Also, more than one copy of the first page may be required for the larger companies, in which case the consecutive numbering of jobs and the grand total per page should be carried onto successive pages.

Section III

Your primary question in this section is to ask the employer if he has any particular requirements that he uses for hiring persons in the various types of jobs listed in Section II. If so, note these carefully, but do not expect employers to be especially definitive in this question, since criteria are typically employed rather casually for most jobs. It is worth re-emphasizing that you must avoid putting the employer in a defensive position on this matter, and your comments should suggest that some jobs may require less specific background than others. You should ask the employer's "authoritative advice" as to whether he feels stated criteria are needed, or just desirable, in each instance.

You will probably obtain much of the above data in an indirect manner, for the employer may be giving you an idealized picture of what he prefers, and you must use skill in determining how closely this is the practice, but without putting words into the employer's mouth. For example, you will want to inquire whether the employer keeps the points of criteria specifically in mind when hiring, or whether this is informally followed. Also determine whether any other persons are involved in hiring, and what approach they use.

The second question in the section is to ask if an application form is used. If it is, and has not already been discussed, you should now determine which items related to requirements are considered important for particular jobs.

The third question in Section III is whether any of the jobs listed are entry jobs into higher positions. Any such entry jobs should be identified by an "E", opposite the title on Item II. Also, you should determine whether the requirements or criteria already discussed included those which prepare for advancement.

After you have noted any criteria matched to jobs for which they apply, you should probably summarize with about the following question: "You have named quite a few requirements here; do you find that you are able to hold to these requirements when hiring most of your employees, or are you forced to compromise on some?" This should serve to bring things from ideals down to practice, and give a better picture of local labor shortages.

Section IV

The previous item may lead to the concession that persistent shortage of qualified applicants may have changed the hiring practice for some jobs. However, we do not want to proceed to this item until the employer has first been given every opportunity to respond spontaneously on his approach to requirements.

This section is relatively straightforward, but should be careful to describe the characteristics of the shortages. For example, if these have recently become shortages, or conversely if they have recently become less critical, this circumstance should be noted. Also, the shortage might manifest itself as an actual numerical shortage of qualified applicants, or as a shortage of qualified applicants among a surplus number who think they are qualified; or some combination. All of this discussion may subtly be revealing of the employer's use of hiring criteria, so that you should be observant for this, and record anything appropriate.

Section V

Although some studies ask for projections to specific dates or periods, it is our experience that an employer usually cannot be this precise in his projections. Encourage him to be as specific as he feels he can; of more actual importance, however, is information as to differential patterns of the future job needs in different categories.

For item (a) make every effort to distinguish replacements of present positions from the two next categories. Although a basic purpose in this question is to aid in estimation of the number of job openings for which workers may compete, it gives valuable collateral information on industries. This accrues from the fact that replacement occurs not only due to retirements, but also due to turnover from resignations. This data will have to be analyzed for effect of advancement within the company also, so that your listing of replacements should be as specific as possible, to determine that they are indeed replacements rather than shifting of personnel. This is pointed up by item (d) which asks whether any of the items in Section V lead from lower entry jobs already listed.

Although you probably should avoid using the term "turnover" in your conversation, yet if the turnover rate seems high, (10% or more) you might ask further, to see whether it is in certain job titles, or differential as to sex, etc, and record any pertinent information. Perhaps certain types of jobs typically have a high turnover rate.

Under item (b) if it should be indicated that numerical increase is expected, it is important to determine if the increase will be proportional across the board (which it usually will not) or which classes of workers will carry the increase. Again, you must determine and distinguish the expansion of existing jobs from the number of emerging jobs next to be discussed.

Item (c) asks for prediction of new types of jobs, and any which are mentioned must be described sufficiently for D.O.T. coding. This is especially important for a second reason also. What may seem to be an entirely new job may later turn out to be a variation of an existing job, or an expansion, perhaps by entry, into additional numbers of a present job. Closely related to this is the consideration whether duties of present jobs will change or enlarge to the extent that new hiring criteria would be necessary.

All these foregoing data are of importance as background for interpretation of the specifics which will follow in the last two sections. At this stage, you have completed the general part of the interview. Before proceeding to Section VI, it is most effective if the employer is made aware that the interview is about to be concluded, but with a summary of data. This at once narrows the interview, while more specifically probing into post-high school education, and into certain vocational areas.

A statement introductory to Section VI will be about as follows: "Now it is important to summarize the experience and training which you have mentioned, and to relate it to things like possible re-training courses, adult education classes, and the like. Do you have any suggestions along this line?"

Section VI

This section could prove to be a duplication of Section III if not handled carefully. As mentioned, its purpose is to change the emphasis somewhat, to a narrower and more intensive consideration, and thus to set the stage for the last item to follow. If few hiring criteria were given earlier, it will be interesting to hear the respondent's views regarding vocational education. Does he know much about it? Does he think any phase of vocational education, including adult classes for his present employees, would contribute anything to their work performance? You may even uncover additional hiring criteria here that the employer overlooked when answering question III. Before recording these, however, be sure they are legitimate hiring criteria, and did not evolve out of some of your own leading questions.

As the discussion of necessity versus desirability in this item leads up to the final key question, you should note particularly whether any mention has been made of farm experience or of training in vocational agriculture for any of the jobs in Section III. Ideally there should be a rather smooth and natural transition from Section VI to Section VII. Throughout the interview we have been narrowing the approach toward an identification of agriculturally related occupations, and at this point we are ready to phase directly into this very important last section.

Section VII

As you enter this last section, the definition of an agriculturally related occupation will be made more specific, and it is necessary that you obtain (or identify from earlier sections) fairly precise information. You should frankly state that in this county we are especially interested in information on agriculturally related occupations. The first phase of this section is to invite the employer to express his comments based on his concept of an agriculturally related occupation, which indeed he may already have done in Section III or elsewhere. In fact, possibly the most defensible definition of an agriculturally related occupation is one which the employer himself indicated in Section III as requiring agricultural experience or training. If he did so indicate, such jobs are to be recorded again in question VII. At this point, he should be asked if any other jobs can be so included. By way of explanation, certain entry jobs might be included which do not in themselves require agriculture, but are logical stepping-stones into other jobs which do require an agricultural background.

If no case has been made for agricultural background prior to Section VII it is doubtful whether we can take the employer very seriously if he now lists several as requiring this experience. Possibly something might be said for jobs which would list it as desirable, now that the point has specific agricultural emphasis in the mind of the employer. It is possible, however, in a few instances in agricultural communities, that the respondent would say he had not mentioned agricultural background because it was "obvious" or "expected" or "assumed". If in your judgment and from observation of his manner of response this does seem legitimate, it should be recorded in Section VII.

The point to be made is this: We hope to discriminate those jobs which employers indicate as needing agricultural experience from those in which it is only desirable. This may prove to be impossible, or at best, uncertain; but we suspect a case may be made if the interviewee states this orientation before we tip our hand regarding our specific interest in the agricultural phase. Insofar as this discrimination is possible for a specific position, it should be identified. An easy method would be to use abbreviated headings such as "ag.n.e.c." or "N", and "ag.des." or "D" with the job numbers listed for each.

As soon as the respondent has finished expressing himself on the first phase of Section VII, but not before, (it being necessary for the interviewer to judge the appropriate time) then the last portion which lists the Vocational Agriculture Curriculum should be produced. That list should be presented to the respondent with a comment that he "is probably familiar with the general headings of the vocational agriculture standard curriculum, but it is easier if he can refer to the list." Now you will ask if the employer thinks a case could be made for giving some of this training to certain of the workers in his company. If he says no, then this ends the interview, except of course for the amenities of appreciation and farewell.

If he does name certain jobs for which agriculture trainings from this list are either necessary or desirable, it will be simple to record this specifically and rapidly. For example, a job of livestock feeder might be listed as one for which Animal Management would be desirable, especially the (B) Livestock program and (C) Herd and Flock Health. The rapid entry would be as follows: "Livestock feeder, (D - I, B & C). It might sometimes be appropriate to enclose several jobs in a bracket, with the general areas of the program recorded just once for the group.

A final note seems in order regarding Section VII. The interviewer will need to be careful that he is not putting words into the respondent's mouth at this point especially. Record agriculturally related jobs only if the employer clearly identifies them "on his own". It would be best to be a bit on the conservative side, and not list a dubious case.

Such decisions are something that you probably will need to develop through your own experience. In short, feel free to explore various points with the interviewee to make the necessary data discriminations in your own mind, but do not go so far that your results reflect mainly your own impressions and conclusions. It will be necessary for us to depend on the effect of your previous training and experience in counseling and interview situations, to make these effects as objective as possible.

In final summary, you can now sense the careful sequence and flow of emphasis in the interview schedule. It will need to be read and worked through a number of times for fluency. You will also have observed how the interview moved from an extensive and general coverage toward an intensive and specific one, and that progressively there were fewer of the jobs involved until the screening effect has removed all job titles from further consideration. You will find that as early data in an interview is referred forward and confirmed, the interview closes very rapidly. In a different county and for different vocational emphasis, the screening would similarly narrow down to a new Section VII for some different vocational area, and thus is a general instrument which is adaptable by means of Section VII. Thus the instrument and the data obtained may be of further value beyond the present Agricultural study.

SUPPLEMENT TO MANUAL FOR INTERVIEWERS
in the Study of Selected Occupations for Idaho

The experience of the four interviewers to date shows a rather remarkable degree of cooperation from employers. This speaks well for the effectiveness of the interviewers and for the general approach of the interview format.

However, as field work proceeds, there emerge certain types of industries and employers for whom the interview is not adapted quite as well, and for which we have obtained general insight from earlier interviews in the same industry code. For these it becomes more and more evident that certain shortcuts, based on good rationale, would be appropriate and possible.

Employer reactions give clues to points which may be shortened. In larger companies with many job titles, a complete list in Item II includes much that is irrelevent to the study. Still, we must not omit titles which might relate to the main divisions in the Vocational Agriculture Curriculum. Some means must be found to obtain those titles without prematurely exposing our agricultural slant.

Some employers respond to section V either with reticence or with uncertainty. However, section VI gives reasons for V which are acceptable to such employers. If the introductory comment on possible adult schooling were to precede V, the responses might be more constructive and less colored by attitude.

There are certain other more subtle effects which can be used to shorten the interview. These are matters of technique and are well discussed by Stewart Harral, in Keys to Successful Interviewing. He says: "All of your interviewees experience a certain emotional reaction when they see you and hear you talk. Use words and questions which lift people . . . .You can make your interviewee feel important by remembering the personal side of his nature . . . . Express yourself in terms of the other person's vocabulary and in terms of his interests." He continues in the general vein that you will be more successful with a modification of the approach "When in Rome, do as the Romans do."

Specifically in this study, responses from small businesses and tradesmen who are managers are likely to be more open if we do not introduce ourselves as from the University, (which the Manual did suggest) but rather state that we are obtaining information for use by the State Vocational Education people, and are interested in the employer's advice.

For the majority of interviews it would be inadvisable to wear a suit. The fact of dress slacks and street shoes is ample evidence of the interviewers' status, whether or not you are wearing a white shirt.

In a machine shop the presence of anyone with a tie or other loose clothing makes workers rather uncomfortable for safety reasons, as well as engendering a feeling of doubt as to whether you would understand their vocational needs. Consequently a degree of informality is appropriate in certain types of interviews, whether short or long.

As to when a short interview is advisable, an example may clarify. After numerous interviews with grocery stores it becomes clear that they do not require agricultural background except in the case of large chains who have their own buyers in produce and meats. (The smaller stores buy through wholesalers.) Thus the major purpose of the interview can be accomplished by asking if the grocery has its own buyers in the field. Of course this approach would not be valid in general throughout the study because it would bias the response with disclosure of the agriculture purpose in advance.

The original Interview Schedule A in its entirety remains necessary for codes whose pattern has not become distinct. For any code in which a repetition of similar agricultural patterns occurs in about 90% of the interviews (in a random sample of perhaps ten or more establishments) a shortened interview format seems proper, to make the field time more productive. It will more quickly and certainly identify that code as non-agricultural, or else as agricultural for specific reasons.

THE SHORTENED INTERVIEW

In order to standardize the approach, the shortened interview experimentally recommended is as follows:

1. Section I is completed as before, with the line asking years and numbers being modified or omitted as being somewhat irrelevant at this stage.

2. Section II is prefaced by a comment that we are studying several job areas which may not require a college degree, and we want to identify jobs in these areas. The first ~~area asked~~ about is the mechanical area. This is followed by Business, Sales, and finally, Agriculture. In each case the employer is to be asked if he has any other important vocational area to suggest besides these.

3. Sections III and IV proceed as in the long interview, but with the shortened job list mentioned above.

4. For Section VI the introductory remarks should include reference to the possibility of "night school, adult classes or trade courses." Section V may be joined with Section VI for better response.

5. For Section VII the interviewer may proceed directly to part (b). It is still important to determine that agricultural applications of the curricula are being considered by the employer, when he indicates a subject field.

6. This short interview may consume only half the time required of the "full" interview. It is also the form in which telephone interviews may be made. These are indicated when the business is a rural address, such as "south of city" or other indeterminate location, and the business shows very few employees. Livestock truckers, and land levelers, for example, are often listed in such manner.

STATE OCCUPATIONAL RESEARCH UNIT
Idaho Occupational Surveys
Interview Schedule A

Date______________ Interviewer__________

I. FIRM: Name____SICM Code__________
Address____
Phone____________________Years in Business__________Number of Employees____
Major Service(s)____
Person Interviewed________________________Title______________________

II. JOB TITLES, and descriptions of work tasks. (From III-c, identify entry jobs to higher positions with an "E", and follow by numeral of the jobs to which it leads

	Numbers Full-Time		Employed Part-Time		
No.	M	F	M	F	T

III. TRAINING a) Requirements b) Application form (yes / no) c) Entry jobs?

IV. SHORTAGES of workers (last five years) b) Have you lowered requirements?

V. Future needs 3-5 years hence (to 1970) (List job numerals, then number needed.)
a) Replacements ____________________
b) Expansions ____________________
c) Emerging jobs (describe) d) Include any "E" ____________________

VI. EXPERIENCE. For titles listed in Item II, determine if there are any types of work experience or educational training (including adult education classes) which would be necessary or desirable (code N or D).

VII. AG. For jobs in Item II, a) determine if employer feels any are agriculturally related. If so, record titles and agricultural areas needed or desired. (Code from Vo-Ag. list) b) ask employer to respond to the list of courses.

Thank him.

VOCATIONAL AGRICULTURE PROGRAM

I.	ANIMAL MANAGEMENT	A.	Dairy and Poultry Program (feeding, housing, and production).
		B.	Livestock (feeds and feeding; selection, improvement and breeding)
		C.	Herd and Flock Health (sanitation and veterinary practice).
II.	PLANT AND SOIL MGMT	A.	Soil Science (soil fertility and chemistry; water management).
		B.	Plant Science (crop production; use of pesticides and insecticides
III.	BUSINESS MANAGEMENT	A.	Business Planning and Methods (budgets, finance and record keeping). (market economics; business organization).
IV.	LEADERSHIP	A.	Future Farmers of America (leadership training; cooperatives).
V.	SUPERVISED EXPERIENCE	A.	Home Farm Projects (animal; crop).
		B.	Work Experience Programs (farms; industry).
VI.	MECHANICS	A.	Farm Power and Machinery (natural gas, electricity, and liquid fuels; farm equipment operation and maintenance).
		B.	Farm Buildings and Conveniences (farm layout and use; livestock housing and sanitation; construction methods and materials).
		C.	Soil and Water Structures (soil and irrigation surveys; terracing, drainage, and irrigation; reservoirs).
		D.	Rural Electrification (wiring and lighting; appliances and equipment; motors and controls; repair, service, and maintenance)
		E.	Agricultural Construction (hand and power tool use and care; welding, forging, and sheet metal; pipes and plumbing; hardware and lumber; painting, glazing, masonry, concrete, and fencing).

APPENDIX B

Data for Agricultural Businesses

This appendix contains five tables, by means of which the businesses studied are grouped according to the degree of agricultural relatedness found in the study.

The column of code numbers at the left in each table indicates the identifications established by the Standard Industrial Classification Manual for the various categories or types of businesses. General headings are given in two-digit figures. When a more specific subdivision of a general division is listed separately, a more specific three-digit identification is used. In some cases an even more specific business type is listed alone, by its four-digit identification, because the findings place it in a different degree of relatedness than others of its more general type.

Frequencies (F) are indicated to show the number of individual companies included in the analysis. A smaller number tends to indicate that the pattern of agricultural relatedness is clearly shown in a few interviews, while larger frequencies represent industries for which the degree of relatedness was not as consistent or certain, and thus required more interviews in order to confirm the data.

Table V is a composite of all the businesses separately listed in Tables I through IV and thus includes all businesses studied. The frequencies are listed in four columns of relatedness, these being the four degrees of relation represented respectively by the Tables I through IV. In Table V the fifth column of frequencies is the totals for the various types of businesses, and will be found to be the same totals as those appearing in prior Tables. Several examples follow.

Thus under Division D in Table V we find category 202, Dairy Products. The total of eleven establishments interviewed includes four highly related, two strongly related, three somewhat beneficial relationship to agriculture, and lastly two not related to agriculture as shown by the entry in column IV. The average (median) of these falls in column II as shown by the underlined number; therefore this industry type, represented by a count of eleven establishments, is placed in Class II, which is in Table II.

The total for Table I indicates 188 establishments represented by industries in this category. However, not every company in these industries was highly related. In Table V the total for column I shows that 209 individual companies were highly related to agriculture (Class I); this figure reflects some establishments whose industry type was not in Class I. For example, SICM category 93 is shown on page 23 to have a median in Class II as underlined in column II; however eight of the establishments described themselves as highly related and thus contributed here to the total of 209 in column I, but were not included in the Class I industries of Table I.

APPENDIX B

TABLE I

Type 1 Businesses

Businesses Highly Related to Agriculture in Idaho, in that they require persons with agricultural training in their dealings with farms.

SICM	F	Description	Degree of Relationship
01	7	Commercial Farms (0119, field crops, 0133, poultry, 0192, horticulture)	Generally highly related
0719	10	Agricultural Services, excluding Animal Husbandry and Horticulture	Generally highly related
201	12	Meat Products (2011, meat packer, 2015, poultry and small game)	Mostly highly related, but varies
203	10	Canning or Preserving (2033, fruits, 2034, dried foods, 2037 frozen foods)	Generally highly related but varies
2063	2	Beet Sugar Refinery	Highly related due to specialty field men
47	10	Transportation Services (includes 4731, stockyards, 4783, packing)	Highly related
50	12	Wholesale Drug and Groceries (5029, chemicals, n.e.c., 5042, general groceries, 5048, fresh fruits)	Generally highly related but varies
5051	16	Wholesale Raw Farm Products	Generally highly related
5099	14	Wholesale Nursery and Miscellaneous	Highly related
5252	33	Retail Farm Equipment	Generally highly related
596	20	Farm Supplies (includes hay, feed and grain, 5962, garden supplies, 5969)	Generally highly related
65	16	Property Management (6512, 6531)	Mostly highly related except for industrial land
6611	15	Realtors and Insurance	Mostly highly related
91	11	Federal Agencies and Contractors	Generally highly related
	188	Total number of businesses interviewed within the SICM codes above	

TABLE II
Type II Businesses

Businesses Rather Strongly Supportive of Agriculture in Idaho. (These make use of persons with agricultural training.)

SICM	F	Description	Degree of Relationship
0731	11	Horticultural Services	Agricultural or Supportive
1621	9	Heavy Construction (Earth moving)	Usually Agriculturally Supportive in Agrarian Counties
202	11	Dairy Products (includes 2022, cheese 2024, ice cream, 2026, fluid milk)	Varies, but generally Supportive in Degree
204	5	Grain Mill Products (includes 2042, prepared foods, 2046, starch milling)	Generally Supportive
35	12	Machinery Manufacturers (includes 3522, farm machinery, 3591, machine shops)	In general, tends to be Supportive in various specialties
37	3	Transportation Equipment Manufacture (includes 3711, automobiles, 3799, industrial stackers and loaders)	Includes many instances of Supportive business
49	5	Sanitary and Water Services (includes 4953, Refuse, 4971, Irrigation systems)	Frequently includes Supportive
508	20	Industrial Equipment (includes 5082, commercial, and 5083, farm equipment)	Generally Supportive
5912	3	Drug Stores	Related only at professional level
5992	4	Florists	About half are Agricultural
602	8	Banks (three types)	About half are Agricultural
6131	4	Agricultural Credit Institutions	Usually have trained Agriculturists
92	4	State Agencies in Agrarian Counties	Generally Supportive
93	25	Local Government Agencies in Agrarian Counties	Most often are Supportive

124 total of 26 types

TABLE III
Type III Businesses

Businesses Which Have Somewhat Beneficial Relationship to Agriculture

Note: Some of these businesses have a consistent, though minor, relationship to Agriculture. Others are quite variable, but tend to average as Beneficial.

SICM	F	Description	Relationship
072	13	Animal Husbandry Services (includes 0722, Veterinary, 0723, Hatcheries, 0724, Animal Husbandry, n.e.c.)	At least Agriculturally benefited, sometimes stronger relationship
1711	17	Plumbing and Heating	Frequently benefited
2394	2	Canvas Products	Often Agriculturally benefited in Agrarian Areas
2711	7	Newspapers	Variable, but often of benefit in Agrarian Areas
421	27	Trucking Services (includes 4212,local, 4213, long distance, 4214, storage)	Variable, frequently beneficial to Agriculture
422	8	Food Warehousing (includes 4221, farm produce, 4222, refrigerated, 4223, food lockers)	Variable, but has frequent relation to Agriculture
483	[illegible]	Radio and TV Broadcasting (4832, 4833)	Variably related
5092	21	Wholesale (Bulk) Petroleum	Variable, usually of Agricultural relation
52	40	Retail Building Supplies (includes 5211 5212, lumber, 5221, plumbing, 5231, paint and glass, 5251, hardware)	Variable, about half are Agriculturally benefited or stronger
54	29	Foods (includes 5411, grocery, 5431, fruit, 5451, dairy, 5462, bakery)	Variable, but most have beneficial relationship
5983	4	Bottled Gas	Variable, but often agricultural in Agrarian Areas
76	16	Repair Services (includes 7621, electrical, 7690, 7699, miscellaneous)	Mainly of beneficial degree of relationship
79	14	Amusement 7942, golf, 7947, country clubs, 7948, racing, 7949, rodeos)	Mainly of beneficial degree of relationship
86	14	Non-Profit Organizations	Variable; at least half are beneficial or stronger
	220	total of 33 types	

TABLE IV

Businesses Which Have Some Potential Agricultural Relation. (These are of two types, either occasionally of relation, or those considered possible but checked and found practically never related.)

SICM	F	Description	Relation
1511	9	Building Contractors	Not Related
1611	1	Highway Construction	Not Related
17	30	Special Trades (construction)	Rarely Related
2051	2	Wholesale Bakeries	Not Related
2086	1	Soft Drink Manufacturer	Not Related
209	6	Animal By-Products and Prepared Feeds	Rarely Related
2431	1	Millwork (cabinet) Shops	Not Related
2511	1	Wood Furniture	Not Related
2819	2	Inorganic Chemicals for Industry	Not Related
319	2	Leather Goods	Rarely Related (saddlery only)
32	11	Gravel Products (3272, concrete products, 3273, ready-mix, 3295 sand and gravel)	Rarely, except for unusual specialty
34	3	Fabricated Metal, except machinery	Not Related
4011	1	Railroads	Not Related
47	3	Freight Forwarding, (4712, transport, 4742, rail car rental)	Not Related
49	5	Electricity (4911) and Natural Gas (4923)	Rarely Related
504	14	Specialty Wholesale Foodstuffs (5045, 5047, 5049)	Rarely Related
5062	1	Electrical Equipment and Controls	Not Related
509	6	Wholesale Special Products (5091, 5094, 5095, 5098)	Rarely Related
5311	3	Department Stores	Not Related

TABLE IV (cont'd)

55	15	Automotive, Service, and Related (5511, 5521, 5531, 5541, 5599)	Not Related
5612	2	Clothing Stores	Not Related
5712	2	Furniture	Not Related
5812	2	Restaurants and Cafes	Not Related
599	4	Miscellaneous Retail (5994, 5999)	Not Related
61	10	Savings and Loan Firms (6122, 6145)	Not Related
63	6	Casualty and Title Insurance (6332, 6333, 6361)	Not Related
6411	12	Personal Insurance Agents	Rarely Related
7031	1	Trailer Parks	Not Related
7251	1	Shoe Repair	Rarely Related
73	8	Business Services (7312, 7321, 7349, 7392, 7399)	Rarely Related
7534	1	Tire Repair	Rarely Related
8911	1	Engineering Services n.e.c.	Not Related

167 total of 53 types

TABLE V

Industry Types Interviewed, With Distribution of Agricultural Relatedness

SICM Groups		Frequency by Degrees of Relatedness				
		I High	II Strong	III Some-what	IV None	V Total
Division A						
01	Commercial Farms (0119, 0133, 0192)	4	3	0	0	7
0719	Agricultural Services	7	2	1	0	10
072	Animal Husbandry Services (0722, 0723, 0729)	4	2	7	0	13
0731	Horticultural Services	5	3	2	1	11
Division C						
1511	Building Contractors	0	0	1	8	9
1611	Highway Construction	0	0	0	1	1
1621	Heavy Construction and Earthmoving	4	1	3	1	9
1711	Plumbing and Heating	0	0	9	8	17
17	Special Construction Trades (1721, 1731, 1771, 1781, 1791, 1794, 1799)	0	2	4	24	30
Division D						
201	Meat Products (2011, 2015)	6	2	2	2	12
202	Dairy Products (2022, 2024, 2026)	4	2	3	2	11
203	Canning and Preserving (2033, 2034, 2037)	5	3	1	1	10
204	Grain Mill Products (2042, 2046)	2	2	0	1	5
2051	Bakeries	0	0	1	1	2
2063	Beet Sugar Refining	2	0	0	0	2
2086	Soft Drink Manufacture	0	0	0	1	1
209	Special Animal Preparations (2094, 2099)	2	0	0	4	6
2394	Canvas Products	0	1	1	0	2
2431	Millwork	0	0	0	1	1
2511	Wood Furniture	0	0	0	1	1
2711	Newspapers	1	2	1	3	7
2819	Inorganic Chemicals	0	0	0	2	2
319	Leather Goods	1	0	0	1	2
32	Gravel (3272, 3273, 3295)	2	1	2	6	11
34	Fabricated Metal (3411, 3449)	0	0	1	2	3
35	Machinery Manufacture (3522, 3591, 3599)	2	4	4	2	12
37	Transportation Equipment (3711, 3799)	0	2	1	0	3

TABLE V (cont'd)

		I High	II Strong	III Some-what	IV None	V Total
Division E						
4011	Railroads	0	0	0	1	1
421	Trucking (4212, 4213, 4214)	6	2	8	11	27
422	Food Warehousing (4221, 4222, 4223)	3	1	1	3	8
47	Freight Forwarding (4712, 4742)	0	0	1	2	3
47	Transportation Services (4731, 4783)	10	0	0	0	10
483	Radio and TV Broadcasting (4832, 4833)	2	1	3	2	8
49	Electric and Gas (4911, 4923)	0	0	2	3	5
49	Sanitary and Water Service (4953, 4971)	1	2	0	2	5
Division F						
50	Wholesale Groceries (5029, 5042, 5048)	6	3	0	1	10
504	Specialty Foodstuffs (5045, 5047, 5049)	1	0	3	10	14
5051	Wholesale Farm Products	9	4	1	2	16
5062	Electrical Equipment and Controls	0	0	0	1	1
508	Industrial Equipment (5082, 5083)	7	9	1	3	20
509	Special Wholesalers (5091, 5094, 5095, 5098)	0	1	1	4	6
5092	Bulk Petroleum	2	8	6	5	21
5099	Nursery	13	1	0	1	15
52	Retail Building Supply (5211, 5221, 5231, 5212, 5251)	6	3	13	18	40
5252	Farm Equipment	20	8	4	1	33
5311	Department Stores	0	0	0	3	3
54	Food Stores (5411, 5431, 5451, 5462)	6	4	9	10	29
55	Automotive (5511, 5521, 5531, 5541 5599)	0	0	4	11	15
5612	Clothing	0	0	0	2	2
5712	Furniture	0	0	0	2	2
5812	Restaurants	0	0	0	2	2
5912	Drug Stores	1	1	1	0	3
596	Farm Supply (5962, 5969)	15	3	2	0	20
5983	Bottled Gas	0	1	1	2	4
5992	Florists	1	1	0	2	4
599	Miscellaneous Retail (5994, 5999)	0	0	0	4	4
Division G						
602	Banks	2	3	3	2	8
61	Savings and Loan (6122, 6145)	0	2	1	7	10
6131	Agricultural Credit	2	2	0	0	4
63	Casualty and Title Insurance (6332, 6333, 6361)	0	0	0	6	6
6411	Insurance Agents	0	2	1	9	12
65	Property Management (6512, 6531)	10	3	1	3	17
6611	Realtors (and insurance)	8	3	0	4	15

TABLE V (cont'd)

		I High	II Strong	III Some-what	IV None	V Total
Division H						
7031	Trailer Parks	0	0	0	1	1
7251	Shoe Repair	0	0	1	0	1
73	Business Services (7312, 7321, 7349, 7392, 7399)	0	1	0	7	8
7534	Tire Repair	0	0	1	0	1
76	Miscellaneous Repair (7621, 7690, 7699)	1	1	9	5	16
79	Amusement and Recreation (7942, 7947, 7948, 7949)	4	0	3	8	14
86	Non-Profit Organizations	3	2	3	6	14
8911	Engineering Service	0	0	0	1	1
Division I						
91	Federal Agencies	8	2	0	2	12
92	State Agencies	2	2	0	0	4
93	County or Local Agencies	8	9	3	5	25
	TOTALS	209	117	131	246	703

APPENDIX C

Data on Agricultural Occupations, as These Occur in Individual Types of Businesses

This appendix contains tables numbered VI through VIII which list occupations of agricultural relationship occurring in individual types of business. Table VI includes occupations occurring in businesses of Table I, (appendix B), Table VII covers occupations in businesses of Table II, and Table VIII refers to businesses from Table III. Furthermore it will be seen that each type of business has its own separate list of agricultural occupations. The frequency of occurrence of each occupation is indicated at the left, under N for "necessary", or D for "desirable". These refer to the employer's descriptions on the one hand, of occupations "needing" agricultural training, or on the other hand, of occupations for which agricultural background or training is "desirable".

Although the descriptive heading of the table refers to "Agricultural Occupations Needed", it may happen that in a given industry the employers rated the occupation only as having agricultural background "desirable". Nevertheless, elsewhere in the tables it will be found that such occupation has been judged by consensus to require agricultural background and thus has been classed as agrarian occupation. The frequencies noted should be interpreted with consideration for the number of establishments represented in the sample.

The six-digit numbers are the identification code numbers from the Dictionary of Occupational Titles, and allow opportunity to refer to alternate titles or duties which may be appropriate for the specific job in a different industry. No attempt was made in these tables to list all the descriptive labels under which the six-digit occupation occurred in different industries interviewed.

Following each industry type is a number which indicates how many establishments were interviewed in that business type. Thus in Table VI the Meat Products businesses, category 2011 included 12 interviews.

TABLE VI

Agricultural Occupations Needed by Businesses of Class I

Frequency Nec.	Des.		
		01	Commercial Farms 7
1		142.081	Greenhouse Superintendent
1		185.168	Manager
1		189.118	Co-owner
1		405.132	Kiln Men
4		406.168	Co-owner
1	1	406.884	Salesman
1		407.181	Landscaper
1		409.168	Foreman - Manager
2		412.168	Manager, Assistant Manager
	1	421.883	Farm Hand, General
1		528.885	Dryer Man
		0719	Agricultural Services 10
	1	162.158	Buyer II
1		183.118	Production Superintendent
4		189.118	Manager, Association Executive
6	2	196.283	Spray Pilot, Airplane Pilot
	1	219.388	Programmer, Detail
	1	235.862	Telephone Operator
4		277.358	Field Representative, Salesman - Cattle and Poultry Food Supplement
1		294.258	Auctioneer
1		413.387	Wool Grader
	1	422.887	Ditch Digger
7		424.883	Foreman, Crew Boss, Sprayer
4	6	466.887	Yardmen, Ring Help, Livestock Caretaker
2	2	521.782	Owner, Grinder Operator
1		621.281	Aircraft Engine Mechanic
	1	638.281	Maintenance Mechanic II
2		844.884	Cement Mason
2		912.384	Airport Serviceman
		2011	Meat Products 12
1		163.118	Manager, Sales
2		169.168	Administrative Secretary
	1	184.168	Director, Program I
4		189.118	Manager, Industrial Organization
2		209.388	Clerk-typist
1		210.388	Bookkeeper I
1		262.358	Salesman, Food Products
1		291.158	Buyer I

TABLE VI (cont'd)

Frequency Nec.	Des.		
		2011	Meat Products (cont'd)
2		292.358	Salesman - Driver
3		316.884	Meat Cutter
1		381.887	Porter II
1		520.685	Sausage Maker
2		525.381	Butcher, All-around
1	1	525.887	Animal Eviscerator
1		620.281	Maintenance Mechanic I
1		638.281	Maintenance Mechanic II
1		904.883	Tractor, Truck Driver
	1	920.887	Marker II (any industry)
		2015	Meat Products 3
1		163.118	Manager, Sales
1		183.118	Production Superintendent
1	1	189.118	Manager, Industrial Organization
1		210.388	Bookkeeper I
3	1	292.358	Salesman - Driver
1		299.138	Department Head, Supermarket
1		409.168	Manager, Farm
1		412.884	Farm Hand, Poultry
2	2	525.887	Animal Eviscerator
		2033	Canning or Preserving 4
1		163.118	Manager, Sales
	2	166.118	Manager
	2	168.287	Agricultural Commodity Grader
2		180.118	Field Man (any industry)
4		183.118	Production Superintendent
2	1	189.118	Manager, Industrial Organization
1		202.388	Stenographer
1		210.388	Bookkeeper II
1		222.387	Shipping and Receiving Clerk
3		299.138	Department Head, Supermarket
	1	521.882	Meat Grinder
	1	521.885	Meat Grinder
	1	526.885	Cook, Fry, Deep Fat
	2	529.886	Cannery Worker
4		638.281	Maintenance Mechanic II
1		638.884	Maintenance Mechanic Helper
	1	920.885	Packager, Machine
1		929.138	Warehouse Foreman
1		929.887	Material Handler

TABLE VI (cont'd)

2034 Canning or Preserving 2

Frequency Nec.	Des.		
	1	029.381	Laboratory Tester II
	1	163.118	Manager, Sales
	2	180.118	Field Man (any industry)
	1	183.118	Production Superintendent
	1	189.118	Manager, Industrial Organization
	1	210.388	Bookkeeper I
	1	213.138	Supervisor, Machine Records Unit
	[illegible]	219.388	Billing Clerk
	3	299.138	Department Head, Supermarket
	1	526.137	Potato Chip Process Foreman
	1	529.687	Egg Candler
	2	638.281	Maintenance Mechanic II
	1	922.887	Yardman II
	1	929.138	Warehouse Foreman

2037 Canning or Preserving 4

Nec.	Des.		
1		020.188	Mathematics Technician
1		022.081	Chemist, Organic
3	3	029.381	Laboratory Tester II
	1	162.158	Broker
	4	163.118	Manager, Sales
1		166.118	Manager, Personnel
	1	169.168	Administrative Secretary
	2	180.118	Field Man (any industry)
	2	183.118	Production Superintendent
	1	184.168	Manager, Warehouse
1	1	189.118	Manager, Industrial Organization
	2	201.368	Secretary
2		202.388	Stenographer
1		209.388	Clerk-typist
2	2	210.388	Bookkeeper II
1		213.582	Key Punch Operator
	1	215.488	Pay Roll Clerk
	1	219.388	Billing Clerk
	3	222.387	Shipping Checker
	1	222.687	Shipping Clerk
	1	223.388	Inventory Clerk
	1	224.587	Weigher I (clerical)
1	1	237.368	Receptionist
1		262.358	Salesman, Food Products
1		292.358	Salesman - Driver
1	3	299.138	Manager, Department
1		311.878	Waiter, Informal
1		313.381	Cook (hotel and restaurant)

TABLE VI (cont'd)

Frequency			
Nec.	Des.	2037	Canning or Preserving (cont'd)
1		318.887	Kitchen Helper
1		372.868	Watchman I
1		373.884	Fire Fighter
1		381.887	Porter II
	1	382.884	Janitor I
5		521.885	Meat Grinder
1		523.885	Driver - Attendant
1		526.885	Cook, Fry, Deep Fat
4	1	529.687	Egg Candler, Sorter
1		529.885	Container, Washer Mechanic
1		637.281	Gas, Appliance Serviceman
1	3	638.281	Maintenance Mechanic II
2		638.884	Maintenance Mechanic Helper
1		699.887	Oiler I (any industry)
1		824.281	Electrician (any industry)
1		862.381	Pipe Fitter I
1		914.885	Pumpman (any industry)
1		920.137	Packing House Foreman
6	1	920.885	Packager, Machine
1		920.887	Packer, Agricultural Produce
3		922.883	Industrial Truck Operator
1		922.887	Laborer, Stores
1		929.883	Tractor Operator
		2063	Beet Sugar Refinery 2
1		022.081	Chemist, Organic
1		029.381	Laboratory Tester II
1		040.081	Agronomist
1		169.168	Administrative Secretary
2		183.118	Production Superintendent
1		189.118	Manager, Industrial Organization
1		202.388	Stenographer
1		210.388	Bookkeeper II
1		215.488	Pay Roll Clerk
1		299.138	Department Head, Supermarket
2		522.885	Sugar Processing Equipment Tender
1		529.687	Egg Candler
1		619.380	Spring Repairman, Hand
1		624.281	Farm Equipment Mechanic I
1		625.281	Diesel Mechanic
4		638.281	Maintenance Mechanic II
2		638.884	Maintenance Mechanic Helper
1		699.887	Oiler I (any industry)
1		812.884	Welder (combination)
2		824.281	Electrician (any industry)
1		922.883	Truck Operator

TABLE VI (cont'd)

Frequency Nec.	Des.		
		4731	Transportation Services 1
1		162.158	Buyer, Livestock
2		189.118	Manager, Industrial Organization
1		210.388	Bookkeeper II
1		219.388	Billing Clerk
2		406.887	Livestock Caretaker
2		904.883	Tractor, Truck Driver
		4783	Transportation Services 9
1		162.158	Field Contact Man
1		163.118	Manager, Sales
1		168.168	Land Use Technician
1		169.168	Administrative Secretary
2		180.118	Field Man (any industry)
11		189.118	Manager, Industrial Organization
2		202.388	Stenographer
6		210.388	Bookeeper I
2		219.388	Budget Clerk
2		222.387	Shipping and Receiving Clerk
	1	292.358	Salesman - Driver
2		299.138	Department Head, Supermarket
	1	404.884	Tree Pruner (agricultural)
2		409.883	Farm Equipment Operator
4		421.883	Farm Hand, General
4		421.887	Farm Hand, General II
1		422.887	Laborer, Irrigation
2		424.883	Sprayer (agricultural)
11		529.687	Egg Candler
1		638.281	Maintenance Mechanic II
6		920.137	Packing House Foreman
7		920.887	Marker II
1		922.887	Yardman II, Laborer, Stores
		5029	Wholesale Drug and Groceries 4
1		163.118	Manager Sales
	1	180.118	Field Man
3	1	183.118	Production Superintendent
1		189.118	Manager, Industrial Organization
	1	219.388	Billing Clerk
	1	277.358	Salesman, Cattle, Poultry, Food, Supplement
1		624.281	Shop Foreman
	1	922.887	Laborer, Stores

TABLE VI (cont'd)

Frequency			
Nec.	Des.	5042	Wholesale Drug and Groceries 3
1		206.388	File Clerk II
3		210.388	Bookkeeper I
1		213.589	Vari-typist
1		222.687	Shipping Clerk (clerical)
1		292.358	Salesman-Driver
1		299.138	Department Head, Supermarket
2		316.884	Meat Cutter
1		920.887	Packager, Hand
1		922.887	Yardman II
1		929.138	Warehouse Foreman
		5048	Wholesale Drug and Groceries 5
1		160.188	Accountant
1	1	180.118	Field Man, (any industry)
4	2	189.118	Manager, Industrial Organization
1		202.388	Stenographer
1	2	210.388	Bookkeeper I
1	1	219.388	Billing Clerk
	1	262.358	Salesman, Driver
	1	277.358	Salesman, Farm and Garden Equipment
1		291.158	Buyer I
1	1	292.358	Salesman, Driver
	2	299.138	Manager, Department
1	2	409.168	Manager, Farm
	1	409.883	Farm Equipment Operator
	1	421.887	Farm Hand, General II
	1	422.887	Ditch Digger
1		529.687	Egg Candler
	1	624.281	Farm Equipment Mechanic I
1		638.281	Maintenance Mechanic II
	1	920.137	Packing House Foreman
1		920.887	Packager, Hand
1		922.887	Yardman II
		5051	Wholesale Raw Farm Products 16
1	1	162.158	Buyer II
3	3	162.168	Buyer, Grain
1	1	169.168	Administrative Secretary
1		180.118	Field Man (any industry)
4	1	189.118	Manager, Industrial Organization
1		202.388	Stenographer
2	1	210.388	Bookkeeper II
5	1	219.388	Clerk, General Office

TABLE IV (cont'd)

5051 Wholesale Raw Farm Products (cont'd)

Frequency			
Nec.	Des.		
1		222.687	Shipping Clerk (clerical)
	1	224.587	Weigher I (clerical)
1		277.358	Salesman, Garden and Farm Equipment
2	1	294.258	Auctioneer
1		421.883	Farm Hand, General I
6	7	466.887	Livestock Caretaker
4		521.885	Meat Grinder
	1	860.281	Carpenter, Maintenance
1		906.883	Fertilizer Serviceman
9	1	922.887	Laborer, Stores

5099 Wholesale Nursery and Miscellaneous 14

Nec.	Des.		
2		003.181	Electronics Technician
1		029.381	Laboratory Tester II
2		040.081	Forester
2		040.381	Seed Analyst
2		162.168	Buyer, Grain
4		169.168	Administrative Secretary
9		180.118	Field Man (any industry)
8		183.118	Production Superintendent
2		185.168	Wholesaler
8	1	189.118	Manager, Industrial Organization
3		209.388	Clerk-Typist
8		210.388	Bookkeeper II
3		219.388	Billing Clerk
4		237.368	Receptionist
1		277.358	Salesman, Cattle, Poultry, Food Supplement
2		289.458	Salesperson, General
1		291.158	Buyer I
1		292.358	Salesman, Driver
3		521.782	Grinder Operator
17		521.885	Meat Grinder
1		521.886	Processor Helper
1		529.687	Sorter, Agricultural Products
	1	553.782	Elevator Operator (any industry)
2		638.281	Maintenance Mechanic II
2		804.281	Sheet Metal Worker
2		812.884	Welder, Combination
2		829.281	Electrical Repairman (any industry)
	1	904.883	Tractor Truck Driver
2		922.883	Industrial Truck Operator
2		922.887	Laborer, Stores
	2	929.133	Foreman (paper and pulp)
3		929.138	Warehouse or Yard Foreman
	1	929.887	Material Handler

TABLE VI (cont'd)

Frequency Nec.	 Des.		
		5252	Retail Farm Equipment 33
1		005.081	Irrigation Engineer
1	2	163.118	Manager, Sales
1		168.168	Manager, Credit and Collection
	1	169.168	Administrative Secretary
6		183.118	Production Superintendent
23	6	185.168	Service Manager
1		186.118	Controller
3		187.168	Manager, Service Department
2	1	189.118	Manager, Industrial Organization
16	8	210.388	Bookkeeper I
6	2	219.388	Budget Clerk
1		219.488	Cost Clerk
15	7	223.387	Parts Clerk
1		237.368	Receptionist
	1	240.368	Collector (clerical)
13	8	277.358	Salesman, Cattle, Poultry, Food Supplement
2		280.358	Salesman, Auto
1	1	289.458	Salesperson, General
	2	292.358	Salesman, Driver
1	1	299.138	Department Head, Supermarket
	1	382.884	Janitor I
1		619.380	Metal Fabricator I (any industry)
1		620.281	Tractor Mechanic
1		620.884	Used Car Renovator
16	7	624.281	Farm Equipment Mechanic I
12	4	624.381	Farm Machine Set-up Man
	2	625.281	Diesel Mechanic
1	2	630.884	Pump Installer
	2	638.131	Mechanic Maintenance, Foreman
2	1	851.887	Pipe Layer Helper
	1	915.867	Auto Service Station Attendant
3		922.887	Laborer, Stores
		5962	Farm Supplies 7
2		163.118	Manager, Sales
1		168.168	Manager, Credit and Collection
2		183.118	Production Superintendent
	1	184.168	Watermaster
	1	185.168	Service Manager
5		189.118	Manager, Industrial Organization
3	1	210.388	Bookkeeper I
1		219.388	Clerk, General Office
1		222.387	Shipping and Receiving Clerk
1		223.388	Inventory Clerk

TABLE VI (cont'd)

Frequency Nec.	Frequency Des.	5962	Farm Supplies (cont'd)
1		249.368	Order Clerk II
	2	277.358	Salesman, Farm Equipment and Supplies
1	1	289.458	Salesperson, General
8	1	292.358	Salesman, Driver
1		382.884	Janitor I
1		520.885	Pellet Mill Operator
1	2	521.782	Grinder Operator (grain mill)
1		521.885	Processor, Grain
1		521.886	Processor, Helper
6		550.885	Mixing Machine Operator (any industry)
1		551.886	Hopper Man
1		638.181	Master Mechanic, Maintenance
1		638.281	Maintenance Mechanic II
1		922.887	Yardman II
	1	929.138	Warehouse Foreman
		5969	Farm and Garden Supplies 13
1		040.081	Agronomist
1		163.118	Research Manager
	1	169.168	Office Manager
1		180.118	Field Man (any industry)
5	3	183.118	Production Superintendent
3		185.168	Service Manager
5		189.118	Manager, Industrial Organization
	1	201.368	Secretary
4		210.388	Bookkeeper II
3		277.358	Salesman, Cattle and Poultry, Food Supplement
5	1	289.458	Salesperson, General
2		404.883	Fruit Harvester Operator
2		409.883	Farm Equipment Operator
1		421.887	Farm Hand, General II
1		424.883	Sprayer (agricultural)
	2	521.130	Laborer
2		521.885	Meat Grinder
1		529.687	Egg Candler
1		638.281	Maintenance Mechanic II
1	1	922.887	Laborer, Stores
2		929.138	Warehouse Foreman
		6531	Property Management 16 + 0
	1	183.118	Manager
1	1	186.118	Controller
	1	186.168	Bank Cashier

TABLE VI (cont'd)

Frequency			
Nec.	Des.	6531	Property Management (cont'd)
8	1	201.368	Secretary
16	4	250.358	Salesman, Real Estate
	2	280.358	Salesman, Auto
		6611	Realtors and Insurance 15
1		163.118	Manager, Sales
5		169.168	Administrative Secretary
4	1	186.118	Controller
1		201.368	Secretary
6		202.388	Stenographer
4	2	210.388	Bookkeeper II
1	1	219.388	Coding Clerk
1	3	237.368	Receptionist
4	3	250.258	Salesman, Insurance
13	1	250.358	Salesman, Real Estate
2		299.138	Department Head, Supermarket
1	1	382.884	Janitor I
		9116	Federal Agencies and Contractors 2
	1	040.081	Agronomist
	1	166.118	Manager, Personnel
	6	168.168	Manager, Credit and Collection
	2	209.388	Clerk-typist
	2	219.388	Billing Clerk
	1	237.368	Receptionist
1		299.138	Grounds Superintendent
1		407.181	Gardener
	1	441.887	Forest Fire Fighter
	1	869.887	Construction Worker II
		9190	Federal Agencies and Contractors 9
1		005.081	Irrigation Engineer
1		022.081	Chemist, Organic
5		040.081	Agronomist
1		096.128	County Agent
1		118.188	Surveyor
1		168.168	Manager, Credit and Collection
	1	168.287	Agricultural Commodity Grader
8		169.168	Administrative Secretary
1		183.118	Production Superintendent
1		186.288	Manager, Insurance Office
1		201.368	Secretary

TABLE VI (cont'd)

Frequency			
Nec.	Des.	9190	Federal Agencies and Contractors (cont'd)
3	1	209.388	Clerk-typist
1		407.884	Grounds Keeper
1		409.883	Farm Equipment Operator
1		421.883	Farm Hand, General I
1		421.887	Farm Hand, General II
1		429.131	Farm Foreman

TABLE VII

Agricultural Occupations Needed By Businesses of Class II

Frequency Nec.	Frequency Des.		
		0731	Horticultural Services 11
	2	142.081	Floral Designer
1		189.118	Manager, Industrial Organization
	3	210.388	Bookkeeper I
2		219.388	Billing Clerk
	1	260.458	Salesperson, Flowers
1		289.358	Salesman, General
	2	292.358	Salesman - Driver
	1	299.478	Delivery Boy
2	1	404.884	Tree Pruner
	7	406.168	Nursery Man
1		406.184	Laborer, Nursery
	1	406.887	Nursery Worker
3		407.181	Landscape Gardener
	2	407.887	Cemetery Worker
1	1	409.181	Tree Surgeon
1		424.883	Sprayer (agriculture)
1		859.883	Dragline Operator
		1621	Heavy Construction 9
1		018.180	Surveyor
1		169.168	Administrative Secretary
1		210.388	Bookkeeper I
1		625.281	Diesel Mechanic
1		812.884	Welder (combination)
7	4	859.883	Dragline Operator
1		860.781	Carpenter, Rough
		2022	Dairy Products 1+2
1		029.381	Laboratory Tester II
	1	159.782	Sterile Processor
1		169.168	Administrative Secretary
1		183.118	Production Superintendent
1	1	189.118	Manager, Industrial Organization
1		638.281	Maintenance Mechanic II
		2026	Dairy Products 8
	1	161.118	Treasurer
	2	162.158	Field Contract Man
	3	163.118	Manager, Sales
	1	168.168	Agricultural Service Investigator

TABLE VII (cont'd)

Frequency Nec.	Des.		
		2026	Dairy Products (cont'd)
	3	169.168	Administrative Secretary
1	6	183.118	Production Superintendent
3	4	189.118	Manager, Industrial Organization
	1	201.368	Secretary
2	2	210.388	Bookkeeper I
	1	211.368	Cashier I
	2	215.388	Bookkeeping Machine Operator
	1	215.488	Pay Roll Clerk
1	1	219.388	Billing Clerk
	1	223.387	Parts Clerk
	1	223.687	Checker I
	1	231.687	Shipping Clerk
	1	290.887	Sales Clerk
4	6	292.358	Salesman - Driver
	2	299.138	Department Head, Supermarket
1	1	372.863	Watchman I
	1	381.887	Porter II
	1	382.884	Janitor I
1	2	469.381	Dairy Tester
1	5	529.782	Buttermaker
	1	529.885	Washer, Agricultural Produce
	3	529.886	Dairy Helper
	1	553.782	Evaporator Operator (any industry)
	2	638.281	Maintenance Mechanic II
2	3	904.883	Tractor, Truck Driver
	2	920.885	Packager, Machine
	1	922.138	Platform Foreman
	1	951.885	Fireman, High Pressure
		2042	Grain Mill Products 5+0
	2	162.168	Buyer, Grain
1		168.168	Land Use Technician
3	1	169.168	Administrative Secretary
1		180.118	Field Man (any industry)
1		183.118	Manager, Branch
1		202.388	Stenographer
1		209.388	Clerk-typist
3		210.388	Bookkeeper I
	1	219.388	Budget Clerk
	1	262.358	Salesman, Food Products
	2	277.358	Salesman, Cattle and Poultry, Food Supplements
	1	289.458	Salesperson, General
3	1	292.358	Salesman - Driver
	1	409.168	Manager, Farm

TABLE VII (cont'd)

Frequency Nec.	 Des.		
		2042	Grain Mill Products (cont'd)
	1	466.887	Livestock, Caretaker
	2	520.885	Pellet Mill Operator
	1	521.782	Grinder Operator
1		521.885	Processor, Grain
	1	529.687	Sorter, Agricultural Produce
2	1	922.887	Material Handler
		3522	Machinery Manufacturers 7
	1	007.181	Mechanical Engineering Technician
1	1	162.158	Field Man
	1	163.118	Manager, Sales
	1	183.118	Production Superintendent
	5	189.118	Manager, Industrial Organization
	2	223.387	Parts Clerk
	2	277.358	Salesman, Cattle and Poultry Food Supplements
	1	292.358	Salesman - Driver
	1	600.280	Machinist I
	1	616.380	Machine Operator I
	1	619.380	Metal Fabricator I (any industry)
	1	619.885	Machine Operator II
1		624.281	Mechanic
	1	706.887	Assembler, Production
	1	741.884	Painter, Spray I
	3	812.884	Welder (combination)
	1	816.782	Flame Cutting Machine Operator
		3591	Machinery Manufacturers 5
1	1	189.118	Manager, Industrial Organization
	1	210.388	Bookkeeper I
	1	299.138	Department Head, Supermarket
	1	512.883	Furnace Charger
	2	518.381	Molder Apprentice
1	1	600.280	Machinist I
	1	661.281	Patternmaker, Wood
	1	705.884	Grinder, Chipper I
		3711	Transportation Equipment Manufacture 1
	1	280.358	Salesman
	1	620.281	Tractor Mechanic
	1	630.381	Oiler

TABLE VII (cont'd)

Frequency Nec.	Frequency Des.		
		3799	Transportation Equipment Manufacture 2
	1	007.281	Draftsman, Mechanical
	1	163.118	Manager, Sales
	1	183.118	Production Superintendent
	1	189.118	Manager, Industrial Organization
	1	219.388	Programmer, Detail
	1	619.380	Spring Repairman, Hand
	1	741.884	Painter, Spray I
		4953	Sanitary and Water Services 2
1		182.168	Foreman
1		184.168	Superintendent
		4971	Sanitary and Water Services 3
	1	025.288	Hydrographer
	1	184.118	Superintendent, Airport
	2	184.168	Watermaster
	1	219.388	Budget Clerk
	2	239.588	Meter Reader
	1	422.887	Ditch Digger
	1	638.281	Maintenance Mechanic II
	1	954.782	Ditch Rider
		5082	Industrial Equipment 15
1		162.158	Purchasing Agent
1		163.118	Manager, Sales
6		183.118	Production Superintendent
3	3	185.168	Service Manager
	3	189.118	Manager, Industrial Organization
1		210.388	Bookkeeper II
	1	219.388	Billing Clerk
1	1	222.387	Shipping and Receiving Clerk
1	2	223.387	Parts Clerk
	2	223.388	Inventory Clerk
	4	276.358	Salesman, Welding Equipment
1	2	289.358	Salesman, General
2		289.458	Salesperson, General
3	3	292.358	Salesman - Driver
	3	299.138	Department Head, Supermarket
	1	600.280	Machinist I
	1	620.281	Tractor Mechanic
	1	625.281	Diesel Mechanic
1		626.381	Repairman
2		633.281	Scale Mechanic

TABLE VII (cont'd)

Frequency			
Nec.	Des.	5082	Industrial Equipment (cont'd)
2		633.281	Scale Mechanic
	1	638.131	Master Mechanic
	1	638.281	Maintenance Mechanic II
	1	922.887	Laborer, Stores
1		929.138	Warehouse Foreman
		5083	Industrial Equipment 5
1		110.108	Lawyer
	1	161.118	Treasurer
	1	169.168	Manager, Office
	1	183.118	Production Superintendent
	3	185.168	Wholesaler
2		189.118	Manager, Industrial Organization
	3	210.388	Bookkeeper I
1		219.388	Billing Clerk
	1	223.387	Stock Clerk
1	1	277.358	Salesman, Cattle and Poultry Food Supplements
1		292.358	Salesman - Driver
	1	624.281	Farm Equipment Mechanic II
	1	624.381	Farm Machinery Set-up Man
	1	922.887	Laborer, Stores
		5912	Drug Stores 3
	1	074.181	Pharmacist
1		185.168	Service Manager
	1	210.388	Bookkeeper II
	1	289.458	Salesperson, General
1		290.478	Sales Clerk
	1	319.878	Fountain Man (or girl)
		5992	Florists 4
	1	142.181	Flower Design
1		189.118	Manager, Industrial Organization
1		260.458	Salesperson, Flowers
2		406.168	Nursery Man
1		406.887	Nursery Worker
		6025	Banks 8
	1	166.118	Manager, Personnel
	2	168.168	Manager, Credit and Collection
4	2	186.118	Controller
	2	186.168	Operations Officer (banking)
2	6	186.288	Loan Officer

TABLE VII (cont'd)

Frequency Nec.	 Des.		
		6025	Banks (cont'd)
1	1	191.287	Appraiser, Real Estate
	3	201.368	Secretary
	2	209.388	Clerk-typist
	2	210.388	Bookkeeper II
	8	212.368	Teller (banking)
	1	213.382	Digital Computer Operator
	4	215.388	Bookkeeping Machine Operator
	2	219.388	Budget Clerk
	3	235.862	Telephone Operator
	4	249.368	New Accounts Teller
	2	249.388	Messenger, Bank
	1	299.138	Department Head, Supermarket
	2	382.884	Janitor I
		6131	Agricultural Credit Institutions 4
1		160.188	Accountant
1		169.168	Administrative Secretary
1		180.118	Field Man (any industry)
2	2	186.118	Manager, Insurance
	1	189.118	Manager, Industrial Organization
2	1	191.287	Appraiser, Real Estate
2		210.388	Bookkeeper II
2	3	219.388	Billing Clerk
		9290	State Agencies in Agrarian Counties 4
1		040.081	Forester
1		166.268	Employment Interviewer
	1	168.287	Agricultural Commodity Grader
1		185.168	Service Manager
2		205.368	Personnel or Reference Clerk
	1	409.883	Farm Equipment Operator
		9349	Local Government Agencies in Agrarian Counties 5
1		162.158	Commission Man, Livestock
3		183.118	Production Superintendent
1	1	184.118	Manager, Irrigation District
1		184.168	Director, Program I
2		189.168	Manager
1		201.368	Secretary
	1	210.388	Bookkeeper I
3		219.388	Billing Clerk
1		249.588	Assistant Collection Clerk
1		269.588	Collection Clerk

TABLE VII (cont'd)

Frequency Nec.	Frequency Des.		
		9349 (cont'd)	
4	1	422.887	Ditch Digger
3		616.380	Machine Operator
1		619.885	Machine Operator II
1		699.887	Oiler I (any industry)
1		809.130	Shop Foreman
	1	859.883	Road Roller Operator
1		899.133	Foreman, Labor Group
2	2	954.782	Ditch Rider
		9379	Local Government Agencies in Agrarian Counties 2
2		188.168	Park Superintendent
3		407.868	Park Caretaker
1		639.884	Lawn Mower Repairman
		9389	Local Government Agencies in Agrarian Counties 12
	1	153.228	Golf Pro
	1	166.268	Interviewer, Personnel
	1	183.118	Manager
	1	209.388	Typist
	2	237.368	Secretary
	2	356.874	Animal Keeper
	2	407.868	Park Caretaker
	3	407.884	Grounds Keeper
	2	422.887	Irrigator
	1	955.782	Assistant Operator
		9390	Local Government Agencies in Agrarian Counties 6
1		018.188	Surveyor
2		029.381	Sanitarian
1		040.081	Technician
	1	096.168	Weed Control Superintendent
	1	160.188	Clerk, Auditor I
4		183.118	Superintendent
2		188.188	Assessor
1	3	210.388	Secretary, Bookkeeper
1		219.388	Billing Clerk
	1	424.883	Sprayer (agricultural)
1		625.281	Mechanic
1		851.883	Patrol Operator
	1	899.133	Foreman, Labor Gang
2		905.883	Crusher, Driver
1		929.883	Dozer Man
2		955.784	Supervisor of Labor Crew

TABLE VIII

Agricultural Occupations Needed by Businesses of Class III

Frequency			
Nec.	Des.	0722	Animal Husbandry Services 9
5	2	073.108	Veterinarian
	6	356.874	Animal Keeper
		0723	Animal Husbandry Services 4
	1	219.388	Billing Clerk
	1	412.137	Incubator Foreman
	1	412.687	Chicken Sexer
	2	412.887	Laborer, Hatchery
	1	442.168	District Manager
		2394	Canvas Products 2
	2	189.118	Manager, Industrial Organization
	1	210.388	Bookkeeper I
	2	739.381	Canvas Worker
	1	787.782	Sewing Machine Operator
		2711	Newspapers 7
1		132.018	Editor, Newspaper
	1	132.038	Editor, Newspaper Department
1	2	132.268	Reporter
	1	162.158	Buyer, Livestock
	1	163.118	Manager, Sales
	1	209.488	Circulation Clerk
	1	209.688	Proofreader I
1		210.388	Bookkeeper I
	1	231.588	Mail Clerk
1	2	258.358	Salesman, Advertising
	1	291.858	Newsboy II
	1	293.358	Solicitor
1		643.885	Bindery Worker
1		650.582	Linotype Operator
1		651.782	Foreman, Press Room
1		651.782	Web Press Man
1		973.381	Compositor I
		4212	Trucking Services 13
4		189.118	Manager, Industrial Organization
1		210.388	Bookkeeper I
1		291.158	Buyer I

TABLE VIII (cont'd)

Frequency			
Nec.	Des.	4212 (cont'd)	
1		409.168	Manager, Farm
2		421.887	Farm Hand, General
2		904.883	Tractor, Truck Driver
2		929.887	Material Handler
		4213	Trucking Services 14
2	2	189.118	Manager, Industrial Organization
	1	210.388	Bookkeeper II
	1	292.358	Salesman - Driver
1		421.883	Farm Hand, General
1		421.887	Farm Hand, General II
	1	466.887	Livestock Caretaker
2		625.281	Diesel Mechanic
	1	638.281	Maintenance Mechanic II
3	2	904.883	Tractor, Truck Driver
		4223	Food Warehousing 5
1		169.168	Administrative Secretary
2		184.168	Manager, Warehousing
	1	185.168	Wholesaler
1	1	210.388	Bookkeeper I
1		525.381	Butcher, All-around
2	1	920.887	Marker II (any industry)
1		922.887	Yardman II
		4832	Radio Broadcasting 6
2		033.187	Radio Engineer
2		131.088	Script Writer
3		159.148	Announcer, Radio
6		184.168	Director, Program I
1		210.388	Bookkeeper I
1		249.688	Broadcast Checker
2		253.358	General Manager
1		255.308	Salesman
		4833	TV Broadcasting 2
	1	159.148	Announcer, TV
		5092	Wholesale (Bulk) Petroleum 21
	3	163.118	Manager, Sales
2		168.168	Land Use Technician
	4	169.168	Manager, Office
1	6	183.118	Production Superintendent

TABLE VIII (cont'd)

Frequency			
Nec.	Des.	5092 (cont'd)	
2	1	185.168	Service Manager
2	3	189.118	Manager, Industrial Organization
3	9	210.388	Bookkeeper II
2		219.388	Billing Clerk
1		277.385	Salesman, Cattle and Poultry Food Supplements
	1	289.458	Salesperson, General
6	9	292.358	Salesman, Driver
	1	299.138	Department Head, Supermarket
1		550.885	Mixing Machine Operator (any industry)
	1	559.885	Tire Recapper
2	1	620.281	Tractor Mechanic
1		637.281	Refrigeration Mechanic
	4	904.883	Tractor, Truck Driver
1	8	915.867	Auto Service Station Attendant
	1	915.884	Tire Repairman
		5211	Retail Building Supplies 16
2		185.168	Service Manager
1		210.388	Bookkeeper I
7		276.358	Salesperson, General Hardware
1		292.358	Salesman - Driver
		5212	Retail Building Supplies 4
	1	183.118	Manager
4		189.118	Manager, Industrial Organization
	1	210.388	Bookkeeper
1		276.358	Salesman
1		292.358	Delivery Man
1		741.884	Painter
1		829.281	Electrician
1		860.381	Carpenter
1		869.884	Assembler, Form Setter
		5221	Retail Building Supplies 4
	1	169.168	Administrative Secretary
	1	183.118	Manager, Branch
	1	277.358	Salesman, Cattle and Poultry Food Supplements
	1	600.280	Machinist I
	2	630.884	Pump Installer
	1	638.131	Master Mechanic, Maintenance

TABLE VIII (cont'd)

Frequency			
Nec.	Des.	5251	Retail Building Supplies 16
1		160.288	Estimator (professional and kindred)
1		169.168	Administrative Secretary
6	1	185.168	Service Manager
	2	189.118	Manager, Industrial Organization
1	2	210.388	Bookkeeper I
	2	219.388	Billing Clerk
1		223.387	Parts Clerk
	1	276.358	Salesperson, General Hardware
1		286.358	Salesperson, Sporting Goods
2	2	289.458	Salesperson, General
1	2	292.358	Salesman - Driver
	1	812.884	Welder (combination)
	1	915.867	Auto Service
	1	929.137	Yardman I
		5411	Foods 26
3		183.118	Production Superintendent
4	2	185.168	Manager, Store I
	1	210.388	Bookkeeper I
1		219.388	Budget Clerk
2	1	223.387	Parts Clerk
7	1	290.887	Salesperson, Food
3		299.138	Department Head, Supermarket
3	1	299.468	Cashier, Checker
6	2	316.884	Meat Cutter
	1	525.381	Butcher, All-around
2		526.781	Baker
1		920.887	Packer, Agricultural Produce
2		922.887	Laborer, Stores
		5431	Foods 2
1	1	185.168	Service Manager
	1	290.877	Salesperson, Foods
		5451	Foods 3
1		189.118	Manager, Industrial Organization
2		292.358	Salesman - Driver
		5983	Bottled Gas 4
	2	183.118	Production Superintendent
	1	186.118	Controller
	1	210.388	Bookkeeper II

TABLE VIII (cont'd)

Frequency			
Nec.	Des.	5983 (cont'd)	
	1	292.358	Salesman - Driver
	1	637.281	Refrigeration Mechanic
	1	904.883	Tractor, Truck Driver
	1	919.168	Dispatcher, Motor Vehicle
		7621	Repair Services 2
1		219.388	Billing Clerk
2		720.281	TV Service and Repairman
		7699	Repair Services, Miscellaneous 13
	1	210.388	Bookkeeper II
	1	619.380	Metal Fabricator I (any industry)
		7942	Amusement and Recreation 3
2		153.228	Golf Pro
1		187.168	Manager, Service Department
1		311.878	Waiter, Informal
1		382.884	Janitor I
1		407.883	Greenskeeper II
		7947	Amusement and Recreation 3
	1	407.883	Greenskeeper
		7949	Amusement and Recreation 7
5		187.168	Manager, Service Department
1		286.358	Salesperson, Sporting Goods
1		311.878	Waiter, Informal
1		372.868	Watchman I
1		382.884	Janitor I
1		407.868	Park Caretaker
1		919.887	Yardman I (agricultural)
		8611	Non-Profit Organizations (Co-operatives) 6
2		132.018	Editor, Magazine
1	1	169.168	Administrative Secretary
1		180.118	Field Man
	1	210.388	Bookkeeper
1		219.388	Billing Clerk

TABLE VIII (cont'd)

Frequency			
Nec.	Des.	8631	Non-Profit Organizations (Labor Unions) 3
1		183.118	Production Superintendent
1		187.118	Business Agent, Union
1		210.588	Insurance Clerk
1		237.368	Receptionist
		8699	Non-Profit Organizations (n.e.c.) 3
2		162.168	Manager
1		169.168	Administrative Secretary
2		187.268	Field Representative
1		189.118	Manager, Industrial Organization
	1	201.368	Secretary
1		202.388	Stenographer
1		219.388	Billing Clerk
1		241.168	Claim Adjuster
3		250.258	Salesman, Insurance
2		299.358	Department Head
1		922.887	Warehouseman

APPENDIX D

Composite listing of Agricultural Occupations

This appendix contains tables numbered IX through XI. Table IX contains all the agrarian occupations occurring in the businesses of Table I, Table X contains the agrarian occupations found in the businesses of Table II, and Table XI contains those occupations relating to businesses of Table III. Any occupation occurring in more than one of these lists is starred. Double stars highlight those of higher frequency when combined.

The frequencies again should not be read as being comparable to one another, but should be considered with reference to the number of establishments interviewed. Thus in Table IX the Electronics Technician, for example, is only tallied as needed twice, while Sales Manager, (163.118) is tallied a total of nineteen times; however a large number of businesses contain sales managers, but only a few types of business contain electronics products. The relative frequency of "necessary" as against "desirable" is important.

Certain occupations which for whatever reason, occur frequently have been underlined in these tables. This highlighting identifies occupations of considerable numbers and in which properly qualified persons of these types may be in short supply compared with the demand in agri-business. The same interpretation is to be given to double-starred items, since they are in large numbers among all agrarian business, though not necessarily within one class.

TABLE IX

Agriculturally Related Occupations Found in 188 Businesses of Class I

D.O.T. Code Identification	Description	Frequency Nec.	Frequency Des.
003.181	Electronics Technician	2	
005.081	Irrigation Engineer	2	
020.188	Mathematical Technician	1	
022.081	Chemist, Organic	3	
029.381	**Laboratory Tester II	5	4
040.081	*Agronomist	9	1
040.381	Seed Analyst	2	
096.128	County Agent	1	
142.081	*Floral Designer	1	
160.188	*Accountant	1	
162.158	**Field Man, Buyer	4	2
162.168	**Buyer, Grain	5	3
163.118	*Manager, Sales	12	7
166.118	*Manager, Personnel	1	3
168.168	**Manager, Credit and Collection	4	6
168.287	*Agricultural Commodity Grader		3
169.168	*Manager, Office	22	4
180.118	*Field Man	16	6
183.118	*Manager, Branch; Production Superintendent	33	7
184.168	**Manager, Stores; Watermaster		3
185.168	*Service Manager	29	7
186.118	**Manager, Finance	5	1
186.288	Loan Officer	1	
187.168	*Manager, Service Department	3	
189.118	*Manager, Industrial Organization	56	9
196.283	Airplane Pilot	6	2
201.368	** Secretary	2	3
202.388	*Stenographer	13	1
206.388	File Clerk II	1	
209.388	*Clerk-typist	9	3
210.388	*Bookkeeper	54	17
213.138	Supervisor, Machine Records Unit		1
213.582	Key-Punch Operator	1	
213.589	Data Typist, Computer	1	
215.488	*Payroll Clerk		1
219.388	*Billing Clerk; Clerk, General Office	20	11
219.488	Cost Clerk	1	
222.387	* Shipping and Receiving Clerk	3	3
222.687	Shipping Checker	2	1
223.387	*Parts Clerk; Stock Clerk	16	7
223.388	* Inventory Clerk	1	1
224.587	Weigher I, Clerical		2

TABLE IX (cont'd)

D.O.T. Code Identification	Description	Frequency Nec.	Frequency Des.
235.862	*Telephone Operator		1
237.368	*Receptionist	7	5
240.368	Collector (clerical)		1
249.368	*Credit Clerk	1	
250.258	*Salesman, Insurance	4	3
250.358	*Salesman, Real Estate	13	1
262.358	*Salesman, Food Products	2	1
277.358	*Salesman, Farm and Garden Equipment	22	12
280.358	Salesman, Auto	2	
289.458	**Salesperson, General	9	3
291.158	*Buyer I	3	
292.358	*Salesman, Driver	19	5
294.258	Auctioneer	3	1
299.138	*Manager, Department	15	6
311.878	*Waiter, Informal	1	
313.381	Cook (hotel and restaurant)	1	
316.884	**Meat Cutter	5	
318.887	Kitchen Helper	1	
372.868	*Watchman I	1	
373.884	Fire Fighter	1	
381.887	*Porter II	2	
382.884	*Janitor I	2	3
404.884	*Tree Pruner (agricultural)	1	
405.132	Kilnman, Hops	1	
406.168	**Nurseryman	4	
406.884	*Laborer, Nursery	1	1
407.181	*Landscape Gardener	2	
407.884	*Groundskeeper	1	
409.168	*Manager, Farm	3	2
409.883	*Farm Equipment Operator	5	1
412.168	*Manager, Hatchery	2	
412.884	Farm Hand, Poultry	1	
421.883	*Farm Hand, General I	7	1
421.887	*Farm Hand, General II	6	1
422.887	Ditch Digger	1	1
424.883	*Sprayer (agricultural)	12	
429.131	Farm Foreman	1	
441.887	Forest Fire Fighter		1
466.887	*Livestock Caretaker, Yards	12	13
504.281	Metal Treatment Inspector	2	
520.685	Sausage Maker	1	
520.885	*Pellet Mill Operator	1	
521.130	Sugar Foreman		2
521.782	**Grinder Operator (feed mill)	6	4
521.885	*Meat Grinder	29	1

TABLE IX (cont'd)

D.O.T. Code Identification	Description	Frequency	
		Nec.	Des.
521.886	Processor Helper	2	
522.885	Sugar Processing Equipment Helper	2	
523.885	Drier Attendant	1	
525.381	*Butcher, All-Around	2	
525.887	Animal Stunner, Eviscerator	3	3
526.137	Potato Chip Processing Foreman		1
526.885	Cook, Fry, Deep Fat	2	1
529.687	*Egg Candler, Food Sorter	19	2
529.885	*Machine Container Worker	1	
529.886	*Dairy Helper		2
550.885	*Mixing Machine Operator (any industry)	6	
551.886	Hopper Man	1	
553.782	*Evaporator Operator		1
619.380	*Metal Fabricator	2	
620.281	*Maintenance Mechanic I	2	
621.281	Aircraft and Engine Mechanic	1	
624.281	Farm Equipment Mechanic I	18	8
624.381	*Farm Machinery Set-Up Man	12	4
625.281	Diesel Mechanic	1	2
630.884	*Pump Installer	1	2
637.281	*Gas Appliance Serviceman	1	
638.131	*Maintenance Mechanic Foreman	1	2
638.281	*Maintenance Mechanic I	16	6
638.884	Maintenance Mechanic Helper	5	
699.887	*Oiler I (any industry)	2	
812.884	*Welder, Combination	3	
824.281	Electrician (any industry)	3	
829.281	*Electrical Repairman (any industry)	2	
851.887	Pipe-Layer Helper	2	1
860.281	Construction Worker I		1
862.381	Pipe Fitter I	1	
869.887	Construction Worker II		1
904.883	**Tractor, Truck Driver	3	1
906.883	Fertilizer Field Man	1	
912.384	Airport Serviceman	2	
914.885	Pumpman (any industry)	1	
915.867	*Auto Service Station Attendant		1
920.137	Packing House Foreman	7	
920.885	*Packager, Machine	6	2
920.887	*Packager, Hand	10	1
922.883	Industrial Truck Operator	6	
922.887	**Laborer, Stores	20	4
929.133	Foreman, Paper		2
929.138	*Warehouse Foreman	7	2
929.883	*Material Handler I	1	
929.887	*Material Handler II	1	1

TABLE X

Agriculturally Related Occupations Found in 138 Businesses of Class II

D.O.T. Code Identification	Description	Frequency	
		Nec.	Des.
007.181	Mechanical Technician		1
007.281	Draftsman, Mechanical		1
018.188	Surveyor	2	
025.288	Hydrographer		1
029.381	**Laboratory Tester II	3	
040.081	**Agronomist	2	
073.108	*Veterinary	5	3
074.181	Pharmacist		1
096.168	Weed Control Superintendent		1
110.108	Lawyer	1	
142.081	*Floral Designer		3
153.228	*Golf Pro		1
159.782	Pasteurizer		1
160.188	*Accountant	1	
160.188	Clerk, Auditer I		1
161.118	Treasurer		2
162.158	**Field Contract Man	3	3
162.168	**Buyer, Grain		2
163.118	**Manager, Sales	1	5
166.118	*Manager, Personnel		1
166.268	Personnel Recruiter	1	
168.168	**Agricultural Service Investigator	1	3
168.287	*Agricultural Commodity Grader		1
169.168	**Administrative Secretary	6	5
180.118	**Field Man, Agriculture I	2	
182.168	Foreman	1	
183.118	* Superintendent	16	13
184.118	Superintendent, Airport	1	2
184.168	** Superintendent, Distribution	2	2
185.168	** Service Manager	5	6
186.118	** Controller	6	4
186.168	Operations Officer, Bank		2
186.288	*Loan Officer	2	6
188.168	Park Superintendent		2
189.118	*Manager, Industrial Organization	9	15
189.168	Superintendent, Plant	2	
191.287	Appraiser, Real Estate	3	2
201.368	** Secretary	1	4
202.388	** Stenographer	1	
205.368	Personnel Clerk	2	
209.388	** Clerk-typist	1	2
210.388	* Bookkeeper I	10	16
211.368	Cashier I		1
212.368	Teller		8

TABLE X (cont'd)

D.O.T. Code		Frequency	
Identification	Description	Nec.	Des.
213.382	Digital Computer Operator		1
215.388	Bookkeeping Machine Operator		6
215.488	*Payroll Clerk		1
219.388	*Billing Clerk	10	10
222.387	*Shipping and Receiving Clerk	1	1
223.387	**Parts Clerk	1	6
223.388	*Inventory Clerk		2
223.687	Checker I		1
231.687	Shipping Clerk		1
235.862	*Telephone Operator		3
239.588	Meter Reader		2
249.368	*New Accounts Teller		4
249.388	Messenger, Bank		2
249.588	Assistant Collection Clerk	1	
260.458	Salesperson		1
262.358	*Salesman, Food		1
269.588	Collection Clerk	1	
276.358	**Salesman, Welding Equipment		4
277.358	**Salesman, Feed	1	5
289.358	Salesman, General	2	2
289.458	**Salesperson, General	2	2
290.478	Sales Clerk	1	
292.358	*Salesman - Driver	11	13
299.138	**Department Head		7
299.478	Delivery Boy		1
319.878	Fountain Clerk		1
356.874	*Animal Keeper		2
372.863	*Watchman I		1
381.887	*Porter II		2
382.884	*Janitor I		3
404.884	*Tree Pruner	2	1
406.168	**Nurseryman	2	7
406.884	*Laborer, Nursery	1	
406.887	Nursery Worker	1	1
407.181	*Landscape Gardener	3	
407.868	Park Caretaker	3	2
407.884	*Groundskeeper		3
407.887	Cemetery Worker		2
409.168	*Manager, Farm		1
409.181	Tree Surgeon	1	1
409.883	*Farm Equipment Operator		1
422.887	Ditch Digger	4	4
424.883	**Sprayer, Agricultural	1	1
466.887	**Livestock Caretaker		1
469.381	Dairy Tester	1	2

TABLE X (Cont'd)

D.O.T. Code Identification	Description	Frequency	
		Nec.	Des.
512.883	Furnace Charger		1
518.381	Coremaker, Molder		2
520.885	*Pellet Mill Operator		2
521.782	**Grinder Operator		1
521.885	**Processor, Grain	1	
529.687	**Sorter, Agricultural		1
529.782	Buttermaker	1	5
529.885	*Agricultural Produce Washer		1
529.886	*Dairy Helper		3
553,782	*Evaporator Operator (any industry)		1
600.280	*Machinist I	1	3
616.380	Machine Operator I	3	1
619.380	*Metal Fabricator (any industry)		2
619.885	Machine Operator II	1	1
620.281	*Tractor Mechanic		2
624.281	Mechanic	1	1
624.381	**Farm Machine Set-up Man		1
625.281	Diesel Mechanic	2	1
626.381	Repairman	1	
633.281	Scale Mechanic	2	
638.131	*Master Mechanic		1
638.281	**Maintenance Mechanic II	1	4
639.884	Lawnmower Repairman	1	
661.281	Patternmaker, Wood		1
699.887	*Oiler I (any industry)	1	
705.884	Grinder, Chipper I		1
706.887	Assembler, Production		1
741.884	*Painter, Spray		2
809.130	Foreman, Metal Fabricating	1	
812.884	*Welder, Combination	1	3
816.782	Flame Cutting Machinist		1
851.883	Patrol Operator	1	
859.883	Dragline Operator	8	5
860.381	*Builders		1
860.781	Carpenter, Rough	1	
899.133	Foreman, Labor	1	1
904.883	**Tractor, Truck Driver	2	3
905.883	Crusher Driver	2	
920.885	*Packager, Machine		2
922.138	Platform Foreman		1
922.887	**Material Handler	2	3
929.138	*Warehouse Foreman	1	
929.883	*Dozer Man	1	
951.885	Fireman, High Pressure		1
954.782	Ditch Rider	2	3
955.782	Assistant Operator		1
955.784	Supervisor, Labor Crew	2	

TABLE XI

Agriculturally Related Occupations Found in 217 Businesses of Class III

D.O.T. Code Identification	Description	Frequency	
		Nec.	Des.
033.187	Radio Engineer	2	
073.108	*Veterinarian	5	2
131.088	Script Writer	2	
132.018	Editor, Newspaper	3	
132.038	Editor, Newspaper Department		1
132.268	Reporter	1	2
153.228	*Golf Pro	2	
159.148	Announcer, Radio and TV	3	1
160.288	Estimater	1	
162.158	**Buyer, Livestock		1
162.168	**Manager	2	
163.118	**Manager, Sales		4
168.168	**Land Use Technician	2	
169.168	*Administrative Secretary	4	6
180.118	**Field Man	1	
183.118	*Production Superintendent	6	10
184.168	**Manager, Warehouse; Watermaster	6	
185.168	*Wholesaler; Service Manager	15	6
186.118	**Controller		1
187.118	Business Manager, Non-Profit	1	
187.168	*Manager, Service Department	6	
187.268	Field Representative	2	
189.118	*Manager, Industrial Organization	14	9
201.368	**Secretary		1
202.388	**Stenographer	1	
209.488	Circulation Clerk		1
209.688	Proofreader I		1
210.388	*Bookkeeper I, II	9	19
210.588	Insurance Administrator	1	
219.388	**Billing Clerk	6	3
223.387	**Parts Clerk	3	1
231.588	Mail Clerk		1
237.368	**Receptionist	1	
241.168	Claim Adjuster	1	
249.688	Broadcast Checker	1	
250.258	*Salesman, Insurance	3	
250.358	**Salesman, Real Estate	3	
258.358	Salesman	1	2
276.358	**Salesperson, General Hardware	8	1
277.358	**Salesman, Cattle and Poultry Food Supplement	1	1
286.358	Salesperson, Sporting Goods	2	
289.458	**Salesman, General	2	3
290.887	Salesperson, Food	7	2
291.158	*Buyer I	1	
291.858	Newsboy II		1
292.358	*Salesman - Driver; Delivery Man	11	13

TABLE XI (cont'd)

D.O.T. Code Identification	Description	Frequency	
		Nec.	Des.
293.358	Solicitor		1
299.138	**Department Head, Supermarket	4	
299.358	Department Head	2	
299.468	Cashier, Checker	3	1
311.878	*Waiter, Informal	2	
316.884	**Meat Cutter	6	2
356.874	*Animal Keeper		6
372.868	*Watchman I	1	
382.884	*Janitor I	2	
407.868	Park Caretaker	1	
407.883	Greenskeeper I, II	1	1
409.168	*Manager, Farm	1	
412.137	Incubator Foreman		1
412.168	*Manager, Hatchery		1
412.687	Chicken Sexer		1
412.887	Laborer, Hatchery		2
421.883	*Farm Hand, General I	1	
421.887	*Farm Hand, General II	3	
466.887	**Livestock Caretaker		1
525.381	*Butcher, All-around	1	1
526.781	Baker	2	
550.885	*Mixing Machine Operator (any industry)	1	
559.885	Tire Recapper		1
600.280	*Machinist I		1
619.380	*Metal Fabricator I (any industry)		1
620.281	*Tractor Mechanic	2	1
625.281	Diesel Mechanic	2	
630.884	*Pump Installer		2
637.281	*Refrigeration Mechanic	1	
638.131	*Master Mechanic, Maintenance		1
638.281	**Maintenance Mechanic II		2
643.885	Bindery Worker	1	
650.582	Linotype Operator	1	
651.130	Foreman, Press Room	1	
651.782	Web Press Man	1	
720.281	TV Service and Repairman	2	
739.381	Canvas Worker		2
741.884	*Painter	1	
787.782	Sewing Machine Operator		1
812.884	*Welder, Combination		1
829.281	*Electrician	1	
860.381	*Carpenters	1	
869.884	Assembler, Form Setter	1	
904.883	**Tractor, Truck Driver	5	7
915.867	*Auto Service Station Attendant	1	9

TABLE XI (cont'd)

D.O.T. Code Identification	Description	Frequency Nec.	Frequency Des.
915.884	Tire Repairman		1
919.168	Dispatcher, Motor Vehicle		1
919.887	Yardman I (agricultural)	1	
920.887	*Marker II (any industry); Packer, Agricultural Produce	3	1
922.887	**Yardman II; Laborer, Stores	4	
929.137	Yardman I		1
929.887	*Material Handler	2	
973.381	Compositor I	1	

APPENDIX E

Design and Statistical Considerations.

The research design in an exploratory type of survey research is not obvious, and is often not stated explicitly, which is perhaps one reason for the lesser status of exploratory research in the minds of some researchers. A brief discussion may therefore be of value.

The subjects or respondents, in an opinion survey, may be considered as members of a continuum, from one extreme of thought, to another extreme. This lends itself to a type of analysis in which deviation from a median opinion is studied. In some cases the opinions may be expressed as a dichotomy, or trichotomy (yes-no-undecided) and the persons interviewed may be identified into two, or several, distinct groups to be compared. We may then utilize a rectangular design and perhaps use a chi-square analysis.

In the present study the situation is somewhat different, and more nearly approaches an item analysis problem. Putting it another way, it has as many questions (or hypotheses) as there are business types. Thus we have the following questions:

> Item 011 Do the employers in specialized Field Crop Farms hire employees needing specific agricultural training.
>
> Item 071 Do employers in Agricultural Service Specialties (such as crop dusting) hire employees for whom they require specific agricultural training.
>
> Item 178 Water Well Drillers are hypothesized to require specific agricultural training in (some of) their employees.
>
> Item 287 The statements of employers in Agricultural Chemical Firms support the hypothesis of no agricultural training needed in employees. This is so at a 95% confidence level.

The above statements, phrased in language successively more adapted to statistical (or null hypothesis) analysis may provide more of the research perspective. The analysis of variance is not routine or typical, however.

In preparation for analysis, each interview is given a value from one to four based on the employer's opinion as to agricultural relatedness of the jobs in his company. Thus "one" identifies definite agriculturally related jobs in the company as indicated by a re-confirmed statement from the employer. A value of "two" indicates that the employer judged agricultural knowledge is really needed, but may be obtained by in-service training, or obtained through courses which are not actually agricultural, (such as a welding course). A value of "three" is given to any company whose employer indicates that agricultural background is desirable but not needed. Finally, value "four" identifies a company whose employer declares that no agricultural training nor experience is needed for any of his employees.

With these values coded, it is possible to obtain an average, or mean value of the several businesses in a certain category. Thus for study (or item) 011 we may determine that a random sample of ten companies in this category were interviewed, and that of these, seven fell in value "one", two fell in value "two" and one fell in value "four". The "mean" of this sample is found to be:

$$M=15/N=1.5$$

Further, this would suggest (if the mean of a sample is representative of the population) that if all of the businesses of this category were interviewed, they would average approximately 1.5 in value. But the data here is discrete, and so must be judged in one of the unit categories. Thus the mean is of no meaning, unless we interpret it to identify the business type as being (1) agricultural, or as (2) "less than agricultural". We have indeed done something of this sort when we established the lists of businesses. The question still remains how we interpret a mean which is fractional.

We might investigate the variance to determine whether the spread of values would span more than one group, but mathemetical variance in this type of sampling is inapplicable. The reason is related to the variance of a sample compared to its universe. A random sample of a (normally distributed) population tends to fall near the mean of the population most of the time. Further, since the n of the sample is smaller than the N of the population, then the dispersion, or range, and thus the variance, will tend to be smaller, according to sampling theory. We may expect the mean of the population to fall within two standard deviations of the mean of the sample with about 95% confidence. The usual picture is somewhat like Figure 1-A.

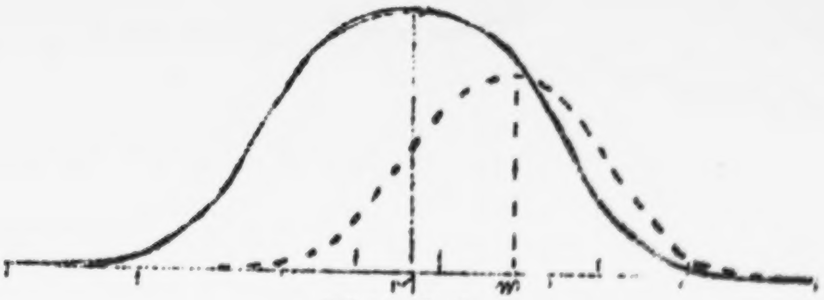

Fig. 1-A

The population mean tends to fall within the range of a random sample.

In the present case, however, with just four values of business, most business types will contain all four; this is especially an effect of small businesses. Thus the range of the sample will be as great as that of the population, but with a small n, it will have a greater dispersion than the population, it is a "flatter" curve. Thus we have the condition of Fig. 1-B. Yet the mean of the sample tends to be close to the mean of the population.

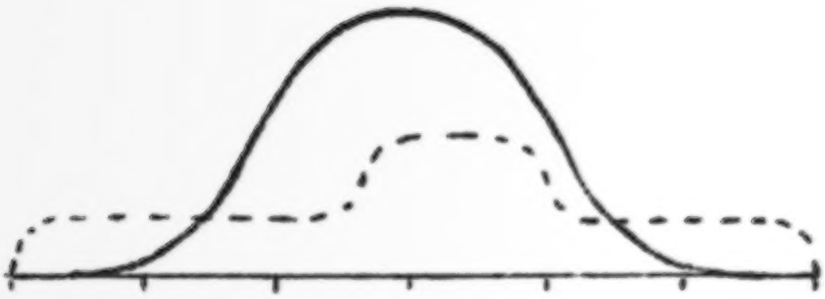

Fig. 1-B

Range of sample tends to coincide with population, in a small population with small range.

In short, the variance in sampling a population of narrow range does not have the usual interpretation. Quite the contrary, a fairly large (say 10%) sample will more closely reflect the universe than variance and deviation analysis might seem to suggest.

Another fallacy of the attempt to use the mean is that for most business types, the distribution will be distinctly skewed. Thus the median is a more meaningful measure of central tendency in the present study. In the example above, the median is 1, and again analysis of variance would not be applicable. It may be important to estimate the degree and direction of skew however, by computing the mean and comparing the median to it.

A factor which is difficult to assess is the fact that the values are not of equal intervals. Thus the category represented by a value of "two" is much more removed from "one" than from "three". This has the effect of making items "one" or "four" quite easy to identify and rate while those which may be "two" or "three" are more difficult to distinguish from each other . A more appropriate though arbitrary scale might be that show below.

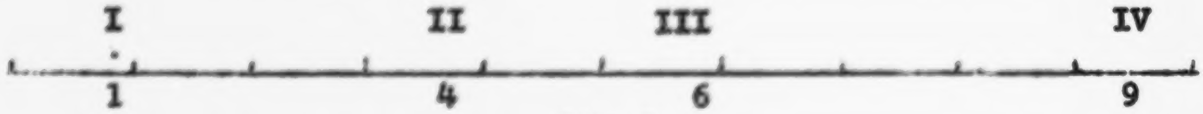

Fig 2

In practice the decision does not require statistical computation. For a given type of business, a decision is made after ten interviews or a 10% sample, whichever occurs first. If there is a variance of answers, but the median falls in the grouping at one of the four unit values (1,2,3, or 4) then the category is established with 80% of the sample agreeing. If that does not occur, then a larger sample is indicated in order to give statistical confidence, although the above pattern is strong. About 70% of a symmetrical hetrogeneous sample will fall within one standard deviation and the 80% we are requiring to be exactly the unit causes at least 90% to be within one standard deviation. We could have achieved a 95% confidence level with only 70% of the sample agreeing. In skewed distributions of small samples the result tends to be even stronger, as most of the businesses sampled give a somewhat homogeneous sample.

Another potential source of error variance is the possibility that interviewing techniques and situations have a wide variance. This could occur in two ways. For example, use of interviewers who are vocational agriculture teachers would tend to produce a pattern of questions, and of responses, heavily slanted towards agriculture, so that variance would be artificially small but skewed. On the other hand, use of interviewers with only brief training tends to give a large variation of possible questions and answers. Both the error of false homogeneity above, and of false heterogeneity, have been minimized in the present study by the strong control of questions and training. Thus the samples taken are unusually free of this source of contamination, and give greater confidence levels as a result.

Finally, as mentioned, the interview schedule contains a built-in sequence which provides a recheck of the employer's certainty of identification. Summing up, the techniques have provided their own statistical structure which gives good, dependable measures and which further statistical treatment might obscure. Thus when businesses with five employees state that they replace their night man each year (because the local college only allows seniors to apply) does this represent true 20% turnover or only "statistically". The fact of small industries gives results here, which are not amenable to statistical interpretation without other interpretation. The degree of kurtosis, skewness, lack of equal unit scales, size of N, and similar factors will be important in the interpretation of any greater statistical treatment. We should have to consider other matters such as non-linear (e.g. three dimensional) contributing factors, and the appropriateness of applying hypergeometric distribution, for example.

Thus, conditions do not warrant highly sophisticated statistical design for over-all analysis of regional data on occupations.